Chemical Industries Week

JANUARY 20, 1951

$800 million wool market facing attack by synthetics; 11 chemical companies moving in . . . . p. 15

High-purity boron nitride opens new research avenues for chemical, refractory fields . . . . p. 25

Largest phosphorus furnace in world brought in by Monsanto; capacity: 50 tons / day . . . p. 34

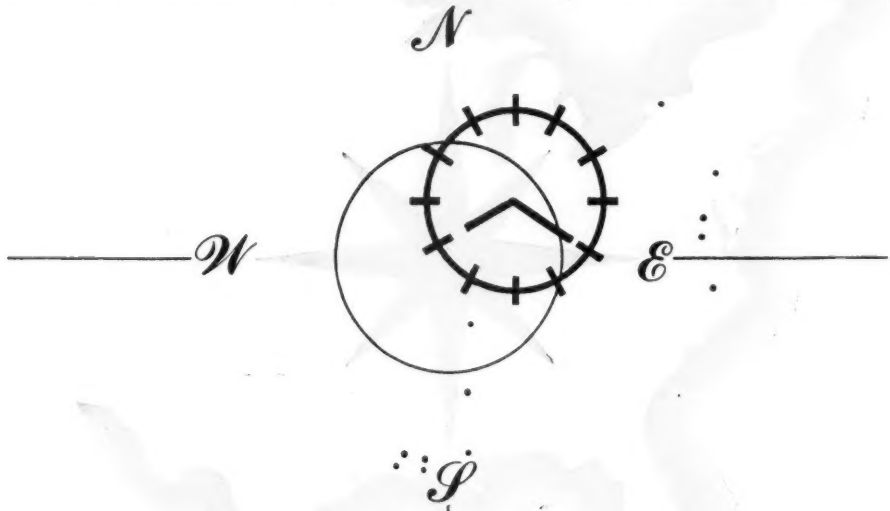
Novel germicide threatening established products; distribution begins in East . . . . . p. 45

Foreman training sessions pay off for Stauffer . . . . . p. 57

A McGRAW-HILL PUBLICATION

DEPENDABILITY

-that delivers heavy chemicals as needed



More than ever before, the new Mathieson signifies dependability to customers. Physically, Mathieson's 14 great plants, strategically located to serve America's chief industrial areas, turn out a wider array of heavy chemicals than any other producer in the country.

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Mathieson
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SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

Chemical Industries —Week—

January 20, 1951

Volume 68 Number 1

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Something New!

What did you think when you first saw this issue of **Chemical Industries?** Seemed a bit strange, didn't it? You noticed the new cover, and probably discovered that a significant word had been added to our name. Yes, CI has become **Chemical Industries Week.** Each week from now on it will help bring you up to date on the latest business news and developments of the chemical process industries.

You saw, too, that some news items had been highlighted on the cover. Even the newsletter type and pictures are indicative of a new faster-reading technique, typical of CI Week's new tempo, in gear with America's fastest moving, fastest changing industries.

Now glance at the adjoining table of contents. Your favorite CI departments—the Newsletter, What's New, Chemical Markets, Specialties—are still there—a little changed, perhaps, but carrying more of the information you want. There are also new features and departments, all with emphasis on the news and the people and companies that make the news, on the business trends and the economic and technical developments that affect your interests.

Why did we decide to make these changes in CI's editorial and publishing program? Actually you readers—or at least a fair proportion of you—made the principal decisions for us. In four separate surveys over a period of many months we queried some 6,000 chemical magazine readers and business men about their informational needs and reading habits. We published two issues of an experimental magazine called "The Chementator" and asked for readers' likes and dislikes.

You told us quite frankly that there was no single publication that adequately served the chemical business man and the business-minded technical man in management and administration. You pointed out that other chemical publications, however excellent, are edited primarily for the interests of particular groups, such as production engineers, research and laboratory chemists. Not one is written for non-technical as well as technically trained men in key positions in the chemical process industries. Not one is designed to serve the reading preferences of administrative management in sales, purchasing and finance, wholesale jobbers and specialty manufacturers. From these chemical executives we found that **Chemical Industries** came closest to meeting their needs, yet as a monthly it was handicapped in providing the flexibility and timely coverage necessary to keep on top of America's No. 1 industry.

So the decision was made, not overnight but as a result of long research and careful planning. We purchased **Chemical Industries** Aug. 1, 1950. Since then its editorial and sales staffs have been greatly expanded to provide for broader coverage and increased frequency of publication. We have been drawing heavily on the experiences and many editorial and publishing resources of McGraw-Hill's vast "network of industrial communications." We've tapped the best editorial brains in the company, its economics, marketing and research departments, the Washington and regional news bureaus, McGraw-Hill World News and other services. Our sole objective: to supply you in concise, readable form with the essential information you need to function more efficiently as key men in this vital industry.

How well have we succeeded? That is still another question for you to answer. We shall always welcome your frankest comment, criticisms and suggestions. We want to make **CI Week** your friendly confidant, your capable and competent companion, your obedient servant that promptly brings you the news you want, when you want it, in the way you want to read it.

The Editors

Here's a tin-and-steel overcoat that both protects and dresses up your

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U.S.I. CHEMICAL NEWS

January ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1951

New Detergent Products Announced by U.S.I.

Two new detergent products, Sipon LS and Sipon LT have been announced by U.S.I. as companion products for Sipon L-20. Sipon LS is essentially sodium lauryl sulfate and Sipon LT is essentially triethanolamine lauryl sulfate. Both are available in limited quantities.

Simple Inexpensive Device Checks for Radioactivity

Development of the first simple and inexpensive device to measure the extent of exposure of individuals to atomic radiation capable of mass production to meet both military and possible civil defense needs — was announced recently. Designated as a self-developing photographic dosimeter the device is small and light, may be hung around one's neck like a soldier's "dog tag," yet will measure very slight to fatal doses of radioactivity.

A reading can be obtained from the dosimeter one minute after exposure, it is claimed, without recourse to a photographic laboratory or the use of supplementary equipment. Because it works on a photographic principle, the dosimeter's sensitivity can be changed simply by altering the type of photographic emulsion used.

The dosimeter is said to consist of a small metal case containing a flat paper package. The package, or plaque, in turn contains photographically sensitized film and a pod of developing solution. The film has graduated scales on its outer edges and an unexposed center part. Exposure to gamma radiation causes the center strip to turn light — the greater the exposure, the whiter the strip. By comparing the center strip with the graded scale on the edges, a good measure of the dosage of radiation received by the dosimeter's user reportedly can be made. Shielding the case blocks out alpha and beta radiation, since gamma rays are the ones to be reckoned with in an atomic explosion.

According to the report, when an individual suspects that he has been exposed to dangerous radiation, he merely pulls a tab from the case. The tab is attached to the film plaque, which is removed. As the plaque passes through a narrow slit in the case, it breaks the pod containing the photographic developing fluids, and spreads the chemicals over the test strip and scale inside the plaque. The user waits approximately one minute, breaks open the plaque, examines the test strip and scale, and learns the extent of his exposure.

New History of Chemistry

A new chart outlining the history of chemistry, expected to have permanent value for practicing chemists, students, and teachers, will be made available soon by a large chemical company. The detailed and comprehensive outline starts with the pre-Christian origins of chemistry in India, China and Egypt, and traces the evolution of the science up to the present time.

U.S.I. Soon to Market New Antibiotic Feed Supplement

New Feed Product Containing Bacitracin To Be Made Available in Commercial Quantities in 1951

In surveying the results obtained with various antibiotics in feeding tests U.S.I. researchers have found a few of the newer antibiotics very promising from the standpoint of cost, feed efficiency, and growth stimulation. Of this group "bacitracin" is the antibiotic found most effective and U.S.I. plans to make it available in commercial quantities to satisfy trade demand by early 1951.

Superior to Many Antibiotics

Bacitracin has certain advantages over the many antibiotics studied for use in feeds because of its high molecular weight. Molecular weight is of importance since the nutritional performance of antibiotics in feeds can be traced directly to biochemical activities within the enteric system of the animal. Lower molecular weight antibiotics have a tendency to be absorbed at a more rapid rate in the intestinal tract so that they do not remain in the enteric system for as long a period of time as bacitracin. This means that the efficiency of some other antibiotics may not be as great as bacitracin in that higher levels of the lower molecular weight products are needed for a comparable effect in the intestinal tract.

The superiority of bacitracin as compared with other antibiotics when fed at various levels is shown in the accompanying table. It should be noted that streptomycin was not effective in promoting growth at low levels.

U.S.I.'s 1951 program calls for making available three products to the feed trade: (1) a vitamin B_{12} supplement made by primary fermentation which has been shown to be superior to pure vitamin B_{12}. This supplement should be of great value in poultry breeding rations since antibiotic feed supplements have no effect in such formulations. (2) an antibiotic product which will contain guaranteed

MORE

Discover Substitute For Titanium Dioxide

Preliminary experiments with zirconium silicate indicate that it is likely to be a useful substitute for titanium dioxide in a wide variety of cosmetic and toilet preparations. Its covering power is lower than that of titanium dioxide but higher than that of zinc oxide and it has a good degree of slip and also has the added property of clinging to the skin in somewhat the same way as does titanium dioxide.

New Journal, 'Antibiotics' To Appear in January

A new medical journal, *Antibiotics*, is scheduled to appear for the first time this month. The new journal, published to meet the need for a special scientific publication in the field of antibiotics, will reportedly feature regular departments on such topics as the fermentation, production, chemical aspects, and pharmacology of both old and new antibiotics.

EFFECT OF DIFFERENT ANTIBIOTICS ON POULT GROWTH

Supplement to Basal Diet		Average Weight at 4 Weeks	
Antibiotic	Level p.p.m.	B B B* Grams	B S W* Grams
None	..	523	435
Streptomycin	10	562	448
Streptomycin	100	617	516
Terramycin	10	644	482
Terramycin	100	661	510
Penicillin G (K salt)	10	630	508
Penicillin G (K salt)	100	630	471
Procaine Penicillin	10	662	463
Procaine Penicillin	100	654	493
Bacitracin	5	655	473
Bacitracin	10	680	506
Bacitracin	100	665	480

*Broad Breasted Bronze and Beltsville Whites.

Table taken from "Antibiotics as Growth Stimulants for Chicks and Turkey Poults" by Dr. James McGinnis, Proceedings of the 1950 Cornell Nutrition Conference for Feed Manufacturers, November 2 and 3, 1950, page 45.

ADVERTISEMENT—*This entire page is a paid advertisement* *Printed in U. S. A.*

January ★ **U.S.I. CHEMICAL NEWS** ★ 1951

New Safety Data Sheet On Styrene Monomer

A new safety data sheet on styrene monomer sets forth pertinent information relating to safe handling and use of the chemical in its manufacture, transportation and storage, and in laboratory application. The manual contains data on important physical and chemical properties of styrene monomer. It deals with a variety of features of safe handling; hazards encountered in storage; loading and unloading of tank cars drums and other containers. Specific attention is directed to fire, explosion, and health hazards, including personal protective measures, first aid, and medical treatment. All data are cross-referenced and adequately documented in relation to Warning Labels, National Fire Codes, Bureau of Explosives, American Standards Association, Interstate Commerce Commission regulations.

Methionine Promotes Growth After Protein Starvation

Recent experiments indicate that methionine can be substituted for vitamin B_{12} for weight recovery after protein starvation. In the tests young adult male rats were maintained on a protein-free diet until they had lost 45 per cent of their body weight and erythrocyte counts had fallen below 5,500,000. Then they were transferred to a diet containing 7 per cent casein along with various supplements. Vitamin B_{12} and liver extract were equally effective in promoting growth. Methionine was considerably more effective, and its action was reportedly not increased by vitamin B_{12}.

CONTINUED

New Feed Supplement

amounts of bacitracin. (3) a combination feed supplement which will carry guaranteed quantities of bacitracin together with U.S.I.'s primary fermentation vitamin B_{12} supplement. Availability of these three products should provide the feed trade with sufficient flexibility to purchase the right product for any specific needs.

Antibiotic Fights Fungi

A new antibiotic isolated by two researchers of a state board of health, has been found effective against certain types of fungus infections in preliminary tests on animals, it is reported. The antibiotic, named "fungicidin," is produced by a species of streptomyces as yet unidentified, and thus far has only been tested in mice and rabbits.

In the tests, the investigators found that no appreciable toxicity was shown by the drug at dosage levels which were both fungistatic and fungicidal. It is hoped that this lack of toxicity will be confirmed in the first clinical trials of fungicidin which are to be conducted soon.

Fungicidin appears in the crude state as a fine, light yellow powder which can be stored in the cold for several months without losing any of its activity.

New Technique Helps Prevent Blood Clots

Anti-clotting chemicals can now be administered in local areas where serious clots may form, it is claimed, without hampering the surgical operation itself. For years surgeons injected anti-clot materials such as heparin and dicumeral into the blood system. This has been successful in saving limbs, but there is the danger of hemorrhages in the area of the operation. To avoid this the new technique has been devised whereby chemicals are administered only to the immediate area where the clot is located. Surgeons reportedly insert a thin plastic tube in the artery near the clot and small quantities of heparin then can be put near the clot without interfering with the operation itself.

Publish 2,500 Digests Of Hydrogenation Literature

A new government publication contains in a single volume 2,500 digests of literature dealing with hydrogenation. The review is said to be the first of a three-part report listing and abstracting all available literature and patent data on the subject.

TECHNICAL DEVELOPMENTS

A new group of organic silicates that remain liquid over an extremely wide temperature range, some from —100°F. to over 700°F., have been developed. Possible uses are heat transfer liquids, lubricants, surface coatings, polishes. **(No. 639)**

A new automotive gauge checks number of miles a car gets on its gasoline at all cruising speeds. Tests with the gauge have shown normal gas consumption can be increased up to 12 per cent with minor adjustments in manifold design. Can be mounted on any automobile. **(No. 640)**

Uniform mixing of a liquid and one or more chemicals or gases with water, sewage or industrial waste is possible now without a mixing tank. Mixing unit is composed of one or more mixing stages and forms part of the influent piping. **(No. 641)**

A new color control device claimed to produce paint in any desired color or finish will soon be on the market. Colors of fabric, inks, or almost anything reportedly can be matched and mixed in a few minutes. **(No. 642)**

For patching glass-lined vessels, a new corrosion-resisting cement has a coefficient of expansion so close to the basic material that patch loosening comes only under severe test. Patch dries at room temperature. **(No. 643)**

For loosening jammed zippers a new greaseless lubricant will not stain fabrics, according to the makers. It comes in a lipstick-type container. **(No. 644)**

100% glass cloth can now be dyed successfully and given a soft, pliable "hand," it is reported. Process can be operated in an almost automatic and continuous fashion, and numerous degrees of softness can be produced. Any thickness of glass fabric can be used — one piece of equipment is all that is needed. **(No. 645)**

A nuclear slide rule has special combinations of scales used only in the radioactivity field. Simple settings of the circular rule offer such values as count rate, statistical error, coincidence loss, activity of sample versus half life, radiation flux after passage through absorbers, etc. **(No. 646)**

A new textile finish that will impart wrinkle- and shrink-resistance to cotton and viscose rayon fabrics has been developed. Treated rayon fabrics are washable. It is stable during storage and treating baths are stable for days at room temperature. **(No. 647)**

A new beaker holder promises safety from lab accidents with hot or corrosive liquids. Made of stainless steel with insulating fiber handles, the holders' rigidity permits attachment to ring stands. Accommodates 1,000, 1,500, and 2,000 ml. beakers. **(No. 648)**

PRODUCTS OF U.S.I.

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Amyl Alcohol (Isoamyl Alcohol)
Butanol (Normal-Butyl Alcohol)
Fusel Oil—Refined
Propanol (Normal-Propyl Alcohol)
Ethanol (Ethyl Alcohol)
Specially Denatured—all regular and anhydrous formulas
Completely Denatured—all regular and anhydrous formulas
Pure—190 proof U.S.P., Absolute—200 Proof
Solox*—proprietary solvent—regular and anhydrous
ANTI-FREEZES
Super Pyro* Anti-Freeze
U.S.I. Permanent Anti-Freeze
ANSOLS
Ansol* M
Ansol* PR
ACETIC ESTERS
Amyl Acetate—Commercial and High Test
Butyl Acetate
Ethyl Acetate—all grades
Normal-Propyl Acetate
OXALIC ESTERS
Dibutyl Oxalate
Diethyl Oxalate
PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate
OTHER ESTERS
Diatol*
Diethyl Carbonate
Ethyl Chloroformate
INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-chloroanilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloroanilide
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Sodium Oxalacetate
ETHERS
Ethyl Ether, U.S.P.
Ethyl Ether, Absolute—A.C.S.
ACETONE — A.C.S.
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Arochem*—modified types
Arofene*—pure phenolics
Aroflat—for special flat finishes
Aroplaz*—alkyds and allied materials
Congo Gums—raw, fused & esterified
Ester Gums—all types
Natural Resins—all standard grades
INSECTICIDE MATERIALS
CPR Concentrates: Liquid & Dust
Piperonyl Butoxide
Piperonyl Cyclonene
Pyrenone* Concentrates: Liquid & Dust
Pyrethrum Products: Liquid & Dust
Rotenone Products: Liquid & Dust
INSECTIFUGE MATERIALS
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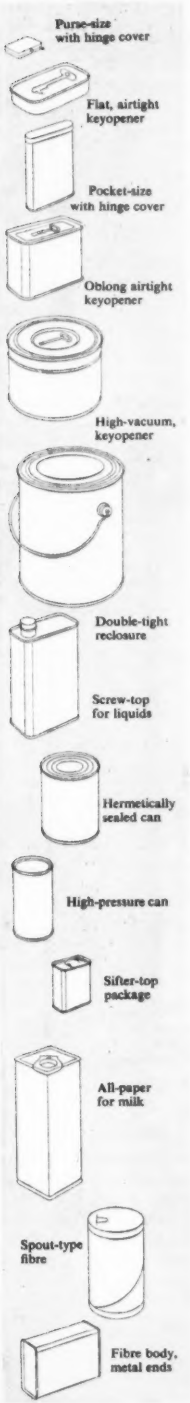

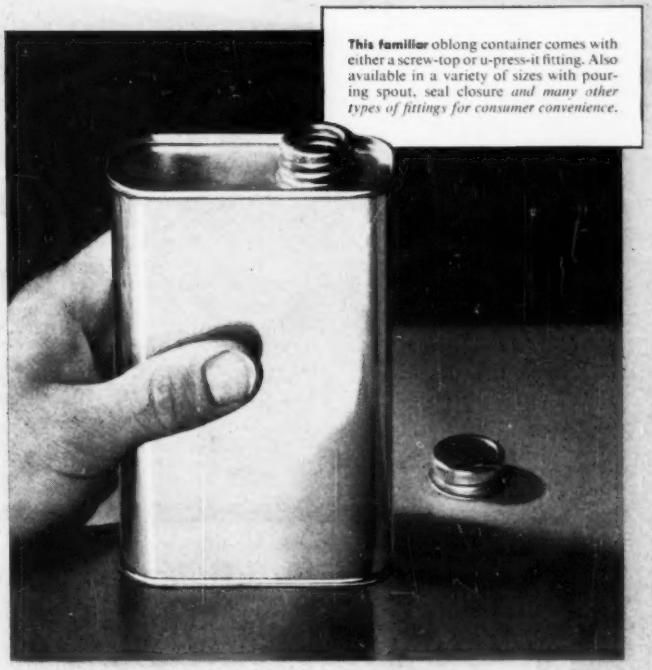

This familiar oblong container comes with either a screw-top or u-press-it fitting. Also available in a variety of sizes with pouring spout, seal closure *and many other types of fittings for consumer convenience.*

Are you considering the consumer when you package liquids?

This container makes friends—keeps 'em!

You know it as the handy can that pours easy, doesn't drip and closes tight.

Advertising experts and sales managers know it as the package that "works with" the label—plenty of space to show your brand in brilliant color.

It now helps sell such products as linseed oil, turpentine, paint and varnish remover, maple syrup, honey.

It could easily do the same robust selling job for liquid detergents, liquid wax or olive oil.

Brass? Silver?

And how about brass or silver polish, glass cleaners?

To sum up, *this container is ideal for many liquids where positive reclosure is essential.*

Don't you think your package-development experts should get together with ours?

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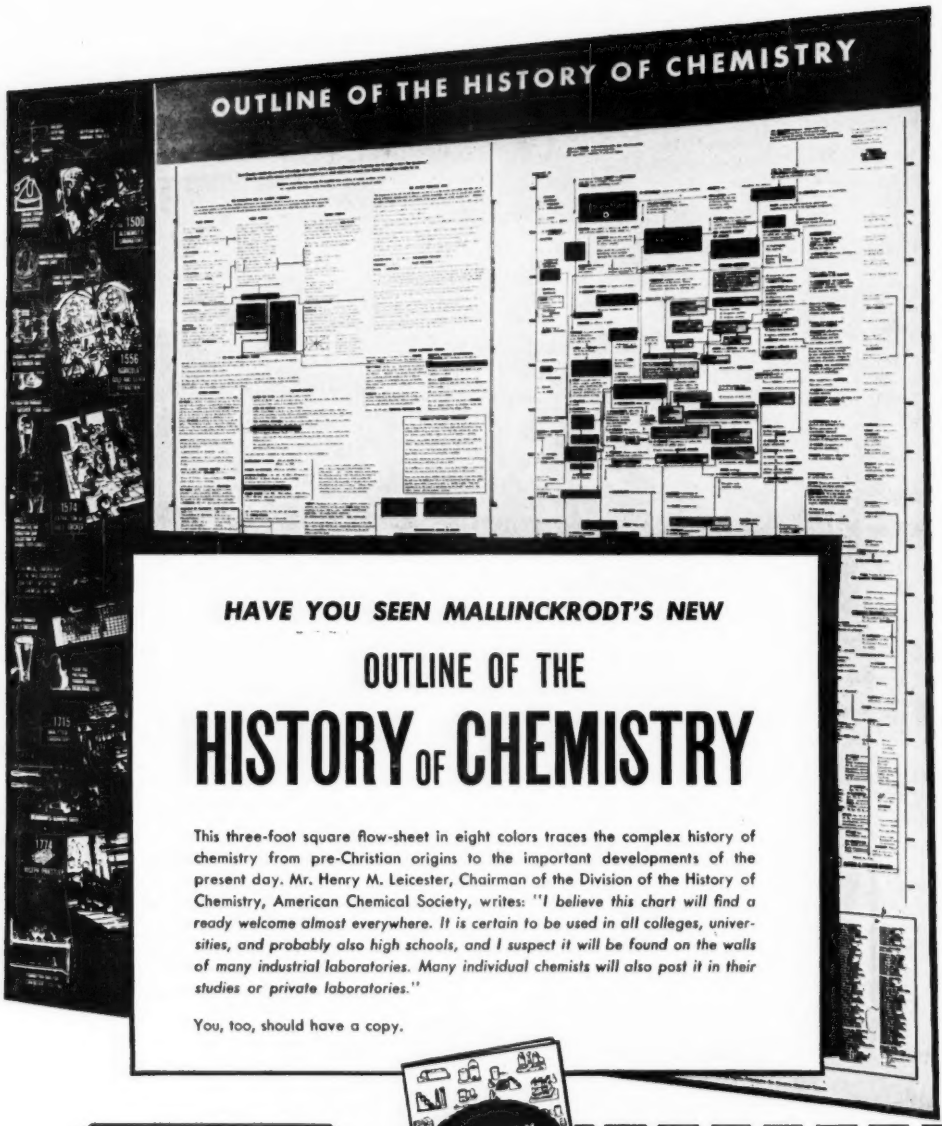
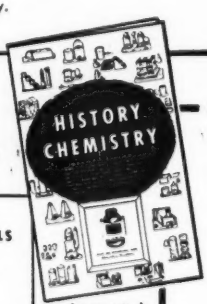


HAVE YOU SEEN MALLINCKRODT'S NEW

OUTLINE OF THE HISTORY OF CHEMISTRY

This three-foot square flow-sheet in eight colors traces the complex history of chemistry from pre-Christian origins to the important developments of the present day. Mr. Henry M. Leicester, Chairman of the Division of the History of Chemistry, American Chemical Society, writes: *"I believe this chart will find a ready welcome almost everywhere. It is certain to be used in all colleges, universities, and probably also high schools, and I suspect it will be found on the walls of many industrial laboratories. Many individual chemists will also post it in their studies or private laboratories."*

You, too, should have a copy.



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OPINION . . . . . .

Manpower Shortage?

TO THE EDITOR: In your December editorial you stressed the imminent shortage of manpower. The statistics you cite seem to justify your conclusion, but current newspaper reports highlighting unemployment in various centers are in direct contradiction to your conclusions . . . .

I can't help but feel that there was a tinge of the melodramatic . . . . . that the dearth of workers was overemphasized . . . . . perhaps unfortunately so.

T. E. DAWE
Buffalo, New York

Reader Dawe has a point, but not a good one. There are pockets of unemployment, and there will be more; that's one thing that credit restrictions are designed to do—shift workers from non-essential to essential industry.

Such dislocations, publicized by ruffled unions, will make the news headlines, convey the impression that the manpower shortage is not acute. Nonetheless, it is, and will worsen.—ED.

PAS Output

TO THE EDITOR: This is to confirm our telephone conversation regarding your article on Para Aminosalicylic Acid in the November issue of CHEMICAL INDUSTRIES.

I should like to point out that insofar as bulk production of Para Aminosalicylic Acid is concerned, we were the first in the United States to offer substantial quantities both for investigational use and for export to other countries. We also wish to point out that we were one of the first to offer and sell to the Veteran's Administration throughout the country. . . . we are one of the largest producers of PAS in the U. S. . . . are currently doubling our production of PAS and its sodium salt.

R. HABER
Hexagon Laboratories, Inc.

These are CI's statements to which reader Haber objects: (1). The R. S. A. Corp. came out with the first commercial batch of PAS late in 1947. (2). . . . Several hundred tons of PAS produced annually by the American Cyanamid Corp. and Tennessee Eastman, along with more modest operators like Hexagon Laboratories, Inc. . . .

Reader Haber does not specifically contradict the former. CI regrets the use of the unfortunately ambiguous term "modest" to describe Hexagon's activities, realizes that this company is a substantial factor in the PAS field. —ED.

That's the Word

TO THE EDITOR: Your choice of the word, "muddled," to describe the methanol situation in your December, 1950 issue (Methanol Muddle, p. 873) is an apt one. Despite your optimistic note that the situation may still become alleviated because of increased production capacity, it is probable that it will get "muddlier" before it gets better.

For one thing as the shooting war gets hotter, such tremendous amounts of formaldehyde will be required to make RDX high explosives that this may well become the major use as it was in World War II. Any help which the ill-fated Morgantown plant can contribute will indeed be pitiful. The combination of John L. Lewis and the hazardous super-high pressure at which the plant operates are problems with which perhaps even the Government cannot cope.

Another factor which makes the problem even more complicated is the relationship to the ethylene situation. Military demands will undoubtedly push acrylonitrile fiber production which at present depends upon ethylene. The attempt of the Du Pont Company to push methanol antifreeze is really sound from a national economy basis since a decreased demand for ethylene glycol would make more ethylene available for other uses. It is fairly well known that Du Pont actually manufactures ethylene glycol from methanol through the methyl glycolate route.

HARRY BURRELL
Interchemical Corporation,
Newark, N. J.

Mathieson Earnings

TO THE EDITOR: I wish to direct your attention to an error which appears on Page 960 of the December CHEMICAL INDUSTRIES. In a table of sales and earnings for the first nine months of 1949 and 1950 our company's 1949 sales are listed as $11,687,720 and 1950 sales as $14,767,980. These two figures are the total earnings from operations for the two periods, and are not sales figures. The net profit figures are correct as reported.

CHARLES J. MURPHY
Mathieson Chemical Corporation
Baltimore, Maryland

CIW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.
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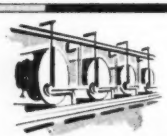

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Chemical Industries Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

Liquid detergents are slated to get plenty of attention soon. Right now Fels & Co. is quietly investigating market possibilities and checking on raw material sources, will decide within a month whether or not it will launch a liquid, light-duty detergent. (Among those now on the market: Glim, Joy, Sky, Sprite, Alli.)

One consideration several detergent sellers have in mind: a shortage of chipboard would crimp powdered detergent sales, enhance prospects for liquids sold in returnable containers.

A new algicide is now being carefully test-marketed by Oronite Chemical Co. (after year-long evaluation in Standard of California's refineries) to chemical plants, power installations and oil refineries in the western and southern parts of the country. Tagged ATM-50, it is a high molecular weight quaternary combined with a synergist. Main market envisioned: control of algae in industrial recirculating cooling water systems. Quantity used: 2 ppm.

Within the next couple of months Bay Chemical Co. (division of Morton Salt Co.) will enter a new field, begin construction of a million dollar unit at Weeks, La. to make microspherical petroleum cracking catalyst. To employ an entirely new process, the plant is scheduled for completion late this year. Sales target: eastern and southern refineries.

Although official comment may not be forthcoming for two or three weeks, McCarthy Chemical Co.'s $8 million methanol-formaldehyde-acetaldehyde plant, shut down since last February, will soon be back in the news. It has, by the way, been kept in standby condition ever since it was closed for re-design and re-engineering studies. McCarthy, incidentally, has had quite a spate of offers for the facilities.

Latest word on popcorn packing (p. 41): Winthrop-Stearns made first shipment of popcorn-packed material as reported. Expansion has been held up by labor trouble, but, despite published reports, Winthrop-Stearns does not expect FDA interference.

That antihistamine-aspirin compound, Hist-O-Plus, test-sold by Anahist Co., Inc., in New England during the past several weeks, has won consumer acceptance, will probably go national shortly. Its components: Thonzylamine hydrochloride, aspirin, acetophenetidin, caffeine.

Three significant developments in zirconium chemistry are in the offing: Titanium Alloy Manufacturing Co. is pilot-planting sponge zirconium (reduction of zirconium tetrachloride) and this metal may soon be battling tantalum for special uses. A prime bet: surgical applications.

Zirconium silicate is also moving in as a replacement for scarce titanium dioxide in face powder formulations. TAM will be in tonnage production of cosmetic-grade zirconium silicate (high purity, particle size less than 5 microns) within a few months. Apart from price advantage (16¢ lb. vs. 40¢ for TiO_2) 50:50 silicate-TiO_2 blends offer better adhesion than straight TiO_2 formulations.

Stabilized fused zirconia is going to be pushed by Norton Co. Output this

year will be quadruple that of 1950 (which was in itself six times that of 1949). Main use at present: firing of barium titanate insulators.

A host of other possible applications are being eyed by Norton and high on the list are the cracking of gases, direct synthesis of nitric acid. Top working temperature of the zirconia: 4700 F.

Plans are being drafted by Consolidated Mining and Smelting Co. for a $9 million ammonium phosphate unit at Kimberley, B. C. Estimated to take two years abuilding, output will be 70,000 tons annually of high-analysis phosphate. (Ammonia to be shipped from Cominco's Calgary plant, phosphate from Montana.)

The proposed project will boost Cominco's annual total fertilizer output to a robust 650,000 tons.

Perhaps it's a trend: Rise, that press-a-button-and-foam-spews-out aerosol-based shave cream, may soon have a competitor. Presto-Shave, a new Seaforth item, is being test-marketed in a limited number of stores in the midwest and south. Price: $1.00 for 6 oz.

There's no official yes or no on this yet, but the Kaiser interests have applied for a certificate of necessity for a 600 ton-a-day soda ash plant to be located on a 2,000-acre site near Freeport, Texas. Output presumably will be to meet Kaiser's needs for production of alumina from bauxite.

Several million dollars will be invested by Merck & Co. for new cortisone facilities at its government-leased Cherokee plant (Danville, Pa.). Completion in 1952 will more than double production capacity for Cortone, Merck's brand of anti-arthritic hormone.

If the need should arise cortisone units could easily turn out substantial quantities of the newly-synthesized Compound F.

Here and There: Contrary to reports being bruited about in the trade, TVA will not cut back its concentrated superphosphate production. Such curbs, considered a few months ago, have been cancelled . . . If you've wondered about that "anti-stalling" gasoline, here's the secret: isopropanol.

Articles of incorporation have been filed by the Mathieson Alabama Chemical Corp. (an affiliate of Mathieson Chemical). This company has made extensive studies of salt deposits in south Alabama.

Piperonyl butoxide, the pyrethrum synergist developed by U. S. Industrial Chemicals, Inc. is now being made in England. Cooper McDougall & Robertson Ltd. is the licensee.

Although the Atomic Energy Commission has had several meetings with Monsanto on that company's plutonium-electricity plant proposal, no decision has been made. Also up for consideration: somewhat similar projects suggested by Dow Chemical and Detroit Edison.

Pittsburgh Coke & Chemical Co. is broadening its line of protective coatings. Hitherto confined to coal tar-based pipeline coatings, the line now includes a vinyl, alkyd, phenolics and chlorinated rubber products.

A Texas company, with large holdings of natural gas, is eagerly seeking a chemical partner. More on this later.

Potash producers are watching activities in the television industry closely, fretting about curbs. The reason: currently more than a quarter of the potash made in the U. S. goes into the glass used for the "big bottle" in television receivers.

. . . The Editors

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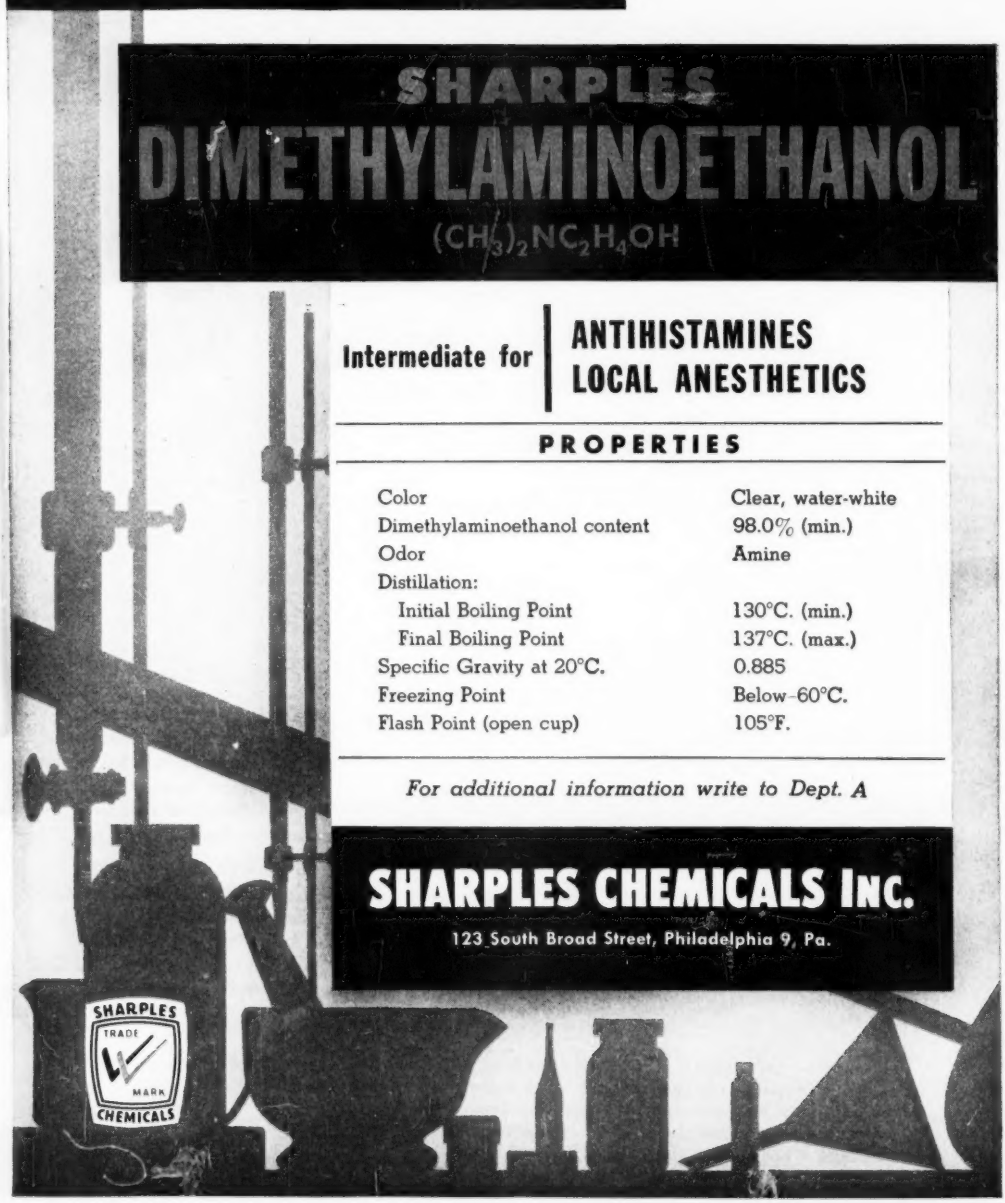
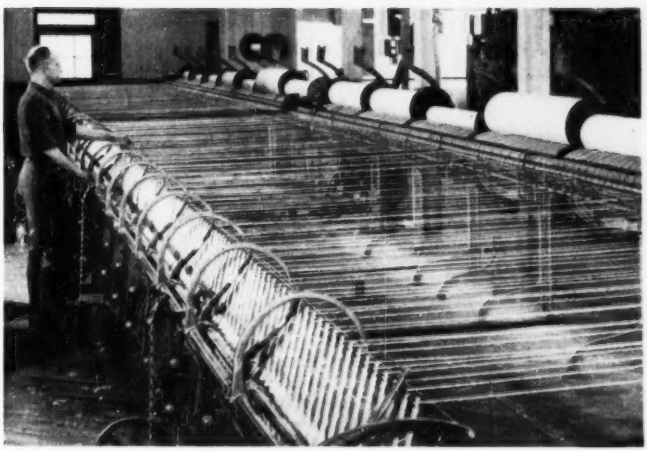


WHAT'S NEW . . . . . .



MAKING NYLON CARPETS: Wool prices graze ceiling, synthetics cover floor.

Successors to Sheep

Soaring wool prices invite competition from regenerated (protein and cellulose) and synthetic textile fibers.

Acrylonitrile-based fibers are front runners in the race to replace wool, although rayon, nylon and protein fibers are making great strides. Carbide and Du Pont already have acrylonitrile fibers; and Chemstrand and American Cyanamid are readying their entries for the market. Others to watch: Du Pont's Fiber V and Allied Chemical's polyacrylamide fiber.

Consumer acceptance is major determinant of the substitute fibers' future growth, but raw material shortages may stunt some of them.

Coveting part of the billion-dollar-a-year wool market comes natural to chemical manufacturers; and wool's present price tag—nearly $3.00 a pound for apparel grade—is a temptation to covetousness that won't be put down.

Wool's roller-coaster price gyrations are an inherent result of its being a natural product, production of which cannot be closely geared to demand. The grade now selling for $3.00 was only $1 in 1946 and 80¢ in 1939.

Abnormal price fluctuation is only one disadvantage of a ranch or farm-grown product: Quality is variable, and standardization is therefore difficult. It is no wonder, then, that attempts have been made, first with azlon* and more recently with synthetics, to overcome the price and quality fickleness of Mary's little lamb.

Azlon fibers were the earliest replacement, and casein was the protein first used. Some casein is still being used—by Rubberset Co. for its Caslen fiber—but more profitable applications for the milk protein have upped the price and preempted much of the supply in this country.

But there are many abundant vegetable proteins, and these have forged ahead rapidly during the past few years. Peanut protein is being spun into fiber (Ardil) in England, and Virginia-Carolina Chemical Co. has studied the protein here. The company will continue to use the corn-derived protein, zein, however, in its production, currently being expanded, of Vicara fiber—a material, incidentally, for which consumer demand is robust. Soy protein was under consideration by Drackett Co. when it was thinking of entering the fiber field.

The azlons are becoming increasingly important; but the lower moisture absorption and higher wet strength of rayon, estron and other totally synthetic fibers give the latter a potentially larger share of the ultimate market. Major outlet for azlons is in blends with stronger, less absorbent fibers.

Rayon staple: After the azlons came rayon staple. In 1945 it first made noticeable inroads in the wool-dominated summer suitings market, accounting that year for a tenth of the total. By 1949 rayon fabrics for the first time outstripped tropical woolen worsteds. Holding rayon back from an even larger share of the current market than it has is the limited supply of staple available.

Latest victory for rayon is in the carpeting field. Carpet-makers are enthusiastic about the staple; Bigelow-Sanford Carpet Co., for example, has bought advertising space to brag that 27% of its carpet production this year will use rayon, both as all-rayon carpeting and wool-rayon blends. Bigelow-Sanford President James D. Wise says that this is only the beginning of the company's increased use of synthetics.

Reason for the switch—both in suitings and carpets—isn't hard to find. Viscose rayon staple is currently selling for 40-41¢ a pound, acetate staple for 48¢. Carpet-grade wool brings

*Azlon is the generic name for man-spun proteinaceous fibers.

about $1.50 a pound and the apparel grade is, of course, about double that.

Actual quantity of rayon used this year to replace wool will be limited, not so much by spinning and weaving capacity as by shortages of basic raw materials.*

Test tube fibers: It seems certain that in the long run the new, totally synthetic fibers will account for the largest dollar value of replacement business. Their custom-built, superior properties, overcoming many of the inherent disadvantages of wool, tab them for success in many general as well as specialized applications. Faith to the tune of $25 million has been demonstrated by Du Pont in its Orlon investment, and Monsanto is spending $30 million just for acrylonitrile capacity to supply Chemstrand's new fiber plant at Decatur, Ala. Even though fibers may be lushly profitable, the high investments necessary for their manufacture will limit membership in the select circle.

Orlon is a polyacrylonitrile and Chemstrand's fiber is reported to be a copolymer of acrylonitrile and vinyl acetate. Production of the former is currently being expanded at Camden, S. C., and plant capacity for the latter is now under construction.

Carbide and Carbon's dynel is another acrylonitrile-based fiber (40% acrylonitrile, 60% vinyl chloride) that is replacing wool in blankets, knit goods and other fabrics. Production capacity at S. Charleston, W. Va., is currently being upped.

Nylon staple has been produced for the past few years and is now going into socks, sweaters, and other knit goods.

Both Imperial Chemical Industries (Wilton, England) and Du Pont (Kinston, N. C.) are building plants to spin the polymeric ester of ethylene glycol and terephthalic acid into fiber. Carothers, prime mover behind nylon, first studied polyesters before turning to the more promising—at that time—polyamides. His work has thus come full circle in the commercialization of the terephthalate fiber (Terylene in England, Fiber V here).

Among the dark horses are American Cyanamid's new acrylonitrile fiber, now moving out of the development phase, and a polyacrylamide fiber in Allied Chemical & Dye Corp.'s laboratories.

Many other major chemical and textile firms are busily testing new synthetics, but their results have not yet appeared above the horizon. The ones mentioned above, then, are the only ones that will have an impact on wool in the near future.

Wool makers worry: Those whose fortunes are tied to wool are concerned with the drop in demand—about 20% last year—for their stock in trade. Chemical treatments to minimize wool's shortcomings (shrinkage, wrinkling, losing crease) are a possible answer, but the modified fiber is naturally more expensive than the original. That unalterable fact, together with the demonstrably lower cost of the in-many-ways-superior synthetics, points to a downhill slide for sheepmen.

* Cellulose is short, acetic acid and anhydride are increasingly hard to find, and cutbacks in sulfur shipments are starting to affect carbon bisulfide and sulfuric acid supply. New Celanese Corp. and American Viscose Co. pulp plants in British Columbia and Alaska would ordinarily relieve the cellulose shortage, but military demands for nitrocellulose may keep the output from rayon manufacturers. New ethanol output by Carbide and Tennessee Eastman may relieve the acetic shortage, but the sulphur situation promises to be of longer duration, with higher prices in the offing (*CI, Nov. 1950, p. 718*).

JAMES D. WISE: This year's 27% is only the beginning.

All Synthetic

Reilly Tar and Chemical Corp. is now expanding its synthetic carbazole by 40%. Process development was spurred by World War II needs for polyvinyl carbazole to replace scarce mica in electrical equipment.

Before World War II, coal tar was by far the greatest source of domestic carbazole.

Critical shortage of mica during the war triggered a search for substitutes that might replace mica in electrical equipment. Polyvinyl carbazole was the eventual choice. It was not as good as mica, but possessed better than average dielectric strength and a reasonably high melting point. Raw materials used to make the polymer were acetylene and carbazole. The latter was extracted from coal tar distillates. Despite polyvinyl carbazole's inferiority to mica, it was suitable for use in certain types of condensers and electronic apparatus where operating conditions did not require the spartan virtues of mica.

Time was ripe: Demand for the plastic made by the General Aniline and Film Corp. soared and soon outstripped the temperamental coal tar supply.

The time was ripe for a synthetic carbazole and in 1944 Reilly Tar and Chemical Corp., Indianapolis, Ind., came up with the first commercial synthetic batch made from o-aminodiphenyl. Output was considerable during the war, reaching 20 tons in the peak month.

Postwar slackoff in electrical production was reflected in the market for polyvinyl carbazole, which dipped sharply. Furthermore, certain of the polymer's weaknesses became evident in actual use. It repeatedly develops cracks under thermal stress and is reported to be thermoplastic above 135 C.

Today, polyvinyl carbazole is used in limited quantities as the effective impregnant in fixed paper capacitors, but it is expected that other improved thermosetting polymers will eventually replace it. In this event, it appears unlikely that any great expansion of cabazole output for the plastic will result from a burgeoning armament program. However, until a better material is actually on the scene, polyvinyl carbazole, in spite of its deficiencies, seems the most logical candidate for its old war job. Needless to say, carbazole production will benefit in no small way.

Uses: Today, most carbazole is taken up as a raw material by manufacturers* of the important hydrone blue dyes. These dyes, probably the most valuable of the vat-blue sulfur group are excellent, fast, cotton dyestuffs. Alkyl derivatives of carbazole serve as lubricants; nitro and halogen derivatives are insecticides. In addition, carbazole can be used to inhibit rancid odors in detergents, and to make rubber anti-oxidants.

Reilly Tar and Chemical makes its carbazole at Newark, N. J., and ships it to its plant at Indianapolis for refining. Selling for $1.55 a pound in ton lots, carbazole, obtainable only as the synthetic, is more expensive than the obsolete coal tar product. However its steady availability in abundant quantities is fair compensation.

* Du Pont, General Aniline, Southern Dyestuff Corp., etc.

Polyvinyl Plasma

Polyvinyl pyrrolidone now in commercial production, is earmarked for use in synthetic blood plasma. Although it cannot substitute for whole blood, the compound is priced favorably and possesses distinct and potentially valuable advantages over natural plasma.

Completion of the first American facilities by the General Aniline and Film Corp. for the commercial production of polyvinyl pyrrolidone spotlights a unique and somewhat startling application: synthetic blood plasma. Despite its successful use in Germany and several other European countries, the product was not available here except in small samples, which have come from General Aniline's laboratories for the past few years.

Controlled preparation insures uniformity and eliminates concern over blood groups and allergic reactions. The powder and its water solution may be stored almost indefinitely. Furthermore, sterilization is easy, reducing the possibility of infection.

Entirely synthetic, the product is an offspring of GAF's high-pressure acetylene units. Butynediol, from formaldehyde and acetylene, is hydrogenated to butanediol. The latter is converted to the lactone and ammoniated to give pyrrolidone. Vinylation and polymerization complete the synthesis. Under the guidance of Area Manager Hans Beller and Special Products Superintendent A. O. Zoss, PVP is pouring forth in tonnage quantities from GAF's Grasselli plant.

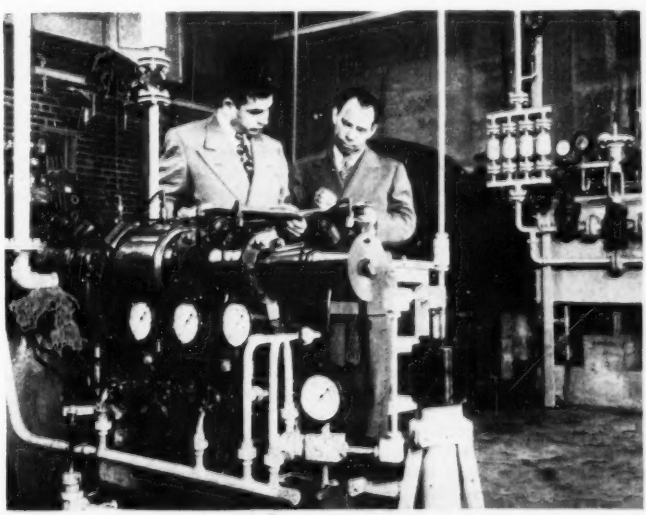
An interesting sidelight on the material is its remarkable chemical complexing ability. This virtue might be ample cause for examination of PVP as a possible detoxifying agent.

Toxicity of a drug is a major hurdle in the path of medical acceptance. If poisonous metabolic residues cannot be effectively detoxified, they will often eliminate the patient while the drug is eliminating the disease.

An effective, supplementary detoxicant could reduce a drug's side-effects without impairing therapeutic potency. If hopes for PVP in this direction pan out, many drugs and pharmaceuticals shelved because of their toxicity might well be reëvaluated. At present, this aspect is merely food for thought, a new avenue requiring intensive exploration.

Further expansion: More than five years of effort have gone into domestic development of PVP. Like all products slated for medical use, final acceptance depends upon successful clearance of biochemical and pharmaceutical tests. Current production is an outgrowth of a gradually increasing demand. Anticipating the future, GAF plans further expansion sometime toward the middle of the year.

Inexpensive compared to human plasma, polyvinyl pyrrolidone looks like a very satisfactory substitute. Although it can never completely supplant whole natural blood, PVP is not only saving lives, but is also leading researchers to a better understanding of blood's vital role.



ZOSS AND BELLER: From acetylene, life's blood.

Rare Advance

Strategic importance of indium, once a rare element but now a valuable industrial commodity, is underscored this week by American rearmament. An essential component of aviation bearings, the metal is also used in solders, hot-dip alloys and lubricants. A petroleum-base lubricant containing indium is now on the market.

As a component of the silver-lead-indium engine bearing, indium cuts down corrosion resulting from solution of lead in acids arising from decomposition of hot lubricating oils, increases mechanical strength, and helps to hold the oil film on bearing surfaces. Old-type bearings had a life span of about 200 hours in normal operation. Indium-alloyed parts last as long as the engine. Superiority of indium bearings is well recognized in industry, and they find widespread use in military aircraft engines.

Lubricating ability of the metal itself is a potentially profitable asset. A thin metallic film of indium is soft and slippery, exhibits a very small viscosity change and coefficient of friction over a wide temperature range, and is exceedingly resistant to chemical attack. Exploitation of these virtues in practical commercial lubricants is now an established fact, and preliminary results are encouraging.

Hollow triumph: Indium's commercial roots go back to 1924. In the search for an agent to prevent the tarnishing of silver, sponsored by Oneida Community Ltd., the quest was centered on rare and minor elements. Dr. William S. Murray, then an Oneida chemist, settled on indium after tests conducted with one gram (total purchasable quantity) of the metal proved its value as a stabilizer of non-ferrous metals. Plated and polished, indium gives a lustrous finish, long-wearing and impervious to corrosion.

Success apparently was a hollow triumph. There just wasn't any indium to be had. Furthermore, the experts were skeptical of the existence of appreciable deposits in this country.

Undaunted, Bill Murray set out to uncover new sources of supply. A small amount of luck and a great deal of hard work paid off with the discovery of a satisfactory indium-bearing ore at the mouth of an abandoned Midwest mine. This first commercial source of indium and subsequent strikes in the far West have upped output a hundred-fold in the last two decades.

Bright future: After successfully

working out the plating process, researchers bent their efforts to finding additional uses for the metal. In 1934, the Indium Corp. of America was launched with Murray at the helm to further commercial development of the metal. Five years later, indium's future appeared bright enough to warrant formation of a group to promote uses and sales. Included in this group were Oneida Ltd. and Anaconda Copper Mining Co.

First commercial use was in dental alloys, after it was found that although soft and ductile, indium lent hardness and strength to platinum, gold, and palladium. Another early application was as a decorative finish for copper, on which a pleasing surface, resistant to oxidation and sulfidation, is produced. Other uses are in glass coloring, formulation of special solders and brazing materials, and in hot-dip alloys affording excellent protection against weathering.

Selling for $30 a troy ounce several years ago, increased production keeping abreast of demand has put indium within reach of industrial consumers. Now available at $2.25 per troy ounce for metal of over 99% purity, the cost of indium required to treat a connecting-rod bearing boils down to the somewhat startling figure of less than one cent. A little goes a long way.

Oldest and largest producer is the Indium Corp. of America, which supplies the metal in bulk or special forms (i.e., anodes, salts, etc.) for process application. Other names in the field are the American Metal Co., Ltd., and American Smelting and Refining Co. No longer a chemical pauper, indium now pays its own way.

WILLIAM S. MURRAY: At the mouth of an old mine, success.

Silicone Finishes

Glidden Co.'s new silicone-base enamel has just advanced to pilot-plant . . . should be commercial by year's end.

Look for wider application of such industrial finishes. Current products have already won acceptance; and Dow Corning and General Electric are supplying improved resins.

But some formulators are going slow. Silicone enamels are relatively high-priced. And pigments—especially titanium dioxide, needed for white stove finishes—are short. Worse, defense production may well gobble up all available silicones.

Glidden heralds its Nubelon (trade name for several grades in a range of colors) as a coating with the surface hardness and chemical resistance of porcelain enamel but without its brittleness. Biggest hurdle in perfecting it was finding pigments equal to the chemical and heat resistance of the vehicle itself. That accomplished, field tests were run on gas and electric heaters, washing machines and refrigerators. As further progress is made, the new material—now over four years in development — will be produced commercially in resin equipment in present Glidden plants.

The commercial trail is already blazed, for companies with successful silicone-based finishes include: Kansas Paint & Color Co. (HR 25 aluminum and HR 40 black and others); Interchemical Corp. (Polythem); Midland Industrial Finishes (Mico). Typical applications have been for space heaters, stove parts, panel inserts, heating units. Nor is Glidden alone in the experimental end, for such companies as Egyptian Lacquer Manufacturing and Standard Varnish Works are typical of those which have materials under test.

Outstanding heat stability, excellent weather and chemical resistance, color and gloss retention above 400 F, and low temperature flexibility are characteristic of silicone resins. Enamels based on these, particularly those pigmented with aluminum powder, have found wide application for stacks, boilers, furnaces, incinerators, steam lines, exhaust systems, heat exchangers, arc light reflectors and the like. Other colored enamels have gone into resistor coatings, identification markings for welding rods and electronic tubes.

Not all roses: On the silicone debit side are these inherent weaknesses: low solvent resistance, thermoplasticity, poor adhesion to steel, incompatibility with most organic film formers,

NEW ENAMELS: Better resins herald wider application.

and the high temperature needed for curing. Here, however, is where the paint formulator steps in, for modified silicone enamels—those used on space heaters are notable—have overcome these drawbacks to a degree.

Both Dow Corning and General Electric—sole makers of the raw materials—are selling a number of products to finishes manufacturers. The former's DC 800 series are straight silicone resins compatible with many resins. Sylkyd 60, a DC development of the past year, is a silicone-glycerol-fatty acid product for making silicone-modified alkyd resins. In addition, silicone-alkyd copolymers with silicone content that can be varied from 75 to 25 per cent are now available from DC in experimental quantities. These copolymers have increased compatibility with organic resins, and heat stability and color retention at high temperatures approaching DC 800 resins. They are faster curing, harder, and more adherent to steel. Likely uses: binders in enamels, either alone

or blended with DC 800 silicones and/or organic resins; in primers for silicone enamels to give improved adhesion without sacrificing color retention.

DC says that the wider latitude in formulation made possible by these materials indicates that enamels with superior weather resistance required by outdoor metal signs and automobile finishes are in the cards.

G-E entries: General Electric has two silicone resin solutions for paint formulations: G-E 81061 and G-E 81182. The latter is unique in its wide compatibility with many modifying resins. The other is compatible to a much less degree.

Preliminary results with these resins show that enamels made from 81182 have surface hardness greater than alkyds, although with 81061, softer surfaces are obtained. Adhesion to steel is slightly inferior to alkyds, but adhesion to aluminum surfaces is far better.

Initial gloss is better than alkyd enamels, and whereas the best alkyds chalked in 4 to 6 months (Florida exposure), properly formulated silicone enamels showed good film integrity and no gloss deterioration after three years.

Other silicone enamel marks in these tests: outstanding in gloss and color retention at high temperatures; slightly inferior in solvent (Esso-Octane) resistance; excellent as compared to "fair" for alkyds in oil resistance at 160 F. Neither 5 per cent caustic nor H_2SO_4 affected them in 100 hours yet caused marked deterioration in alkyds in 24 hours. Both alkyds and silicone enamels retained gloss in salt spray test, but the latter showed excellent rust resistance while the former rusted extensively. Iodine, mercurochrome and grape juice did not stain silicone enamels; stained alkyds badly.

Draft bait, and dear: Paint makers like such properties, and both GE and DC resins have won industry attention.

Some manufacturers, however, fear the tightening pinch in all resins will hit the silicones as their unique properties are tapped for war. They also point out that the price range even for modified alkyd types ($10-12 a gallon) is too high for many applications where they are superior, but where other materials are doing a satisfactory job. Shortages of titanium dioxide (one of the reasons Glidden's material won't hit the market for about a year) is another factor in some paint men's wait-and-see attitude.

PHENACETIN MANUFACTURE: The kettles may switch to APAP.

Tons of APAP

Acetyl-p-aminophenol is rapidly coming into its own as a valuable commercial property. An efficient new analgetic,* it combines safety with rapid action. Although it probably won't dull the public taste for aspirin, the product, now in tonnage production, anticipates a healthy call from makers of a variety of pain-relieving preparations.

APAP, as it is known to the trade, came about as a result of eight years' research sponsored by the Institute for the Study of Analgesic and Sedative Drugs; an organization supported by a good many drug houses and chemical companies interested in the pharmaceutical business. Commercial development is credited in large measure to the Sumner Chemical Co., Zeeland, Mich., which first made the pure product in quantity.

Main experimental stumbling block was determination of the drug's analgetic potency. Laboratory animals are generally reluctant to admit whether a drug is helping their headaches. To get around this difficulty, researchers used a test known as the Wolff-Hardy technique, whereby a gradually intensifying beam of light is focused on a human subject's forehead and maintained until painful. By timing onset of pain, before and after administration of APAP, an estimate of the drug's analgetic prowess is obtained and expressed as "pain threshold elevation".

Persons undergoing such tests must be trained to recognize the same degree of pain in each test, so that reaction time will be a reliable comparison of pain threshold. Despite some obvious shortcomings of this technique, it is the best available. Results, though not foolproof, are generally accepted as valid.

Equal effect: On the basis of "pain threshold elevation" measurements, APAP is equal in effectiveness to the old standbys, phenacetin and acetanilid.

Really safe: Where APAP really shines is in its lack of toxicity. No toxic symptoms of any sort have been observed in over 1,000 clinical cases; some received sixty grains a day for six weeks. After-effects of aspirin, phenacetin, acetanilid and the like, while uncommon, are still disturbing to some people. Perhaps the most frequent complaint is gastric discomfort resulting from aspirin's acid reaction in the stomach. APAP on the other hand has a neutral reaction, is harmless to the blood and the gastro-intestinal and genito-urinary systems.

APAP has been recognized as an antipyretic (fever-reducing drug) for almost thirty years, but only recently have its analgetic powers been appreciated. Reason was the discovery that APAP is the principal metabolic product of acetanilid and phenacetin, both analgetics in their own right. Most ingested acetanilid is converted in the body to acetyl-p-aminophenol (APAP) which is then esterified and excreted as the glucuronate and sulfate. Acetanilid itself is never recovered in more than minute fractions. Why then, was it not logical to assume that APAP was the agent (or one of the agents) giving the analgetic action? The test was to administer APAP instead of acetanilid and determine any resulting pain-killing activity. Results were not long coming, and it was proved that an equal analgetic effect was produced in humans by equivalent doses of acetanilid or APAP.

Fast worker: APAP appears to act faster than acetanilid and phenacetin as it does not require biochemical conversion to do its job. The only apparent reaction APAP undergoes is conjugation to form glucuronic and sulfuric esters, which the body eliminates more readily than the original substance.

In April, 1948, Sumner formally unveiled its new pharmaceutical, making APAP available for investigation. Not until the next year was a cash sale made, and in 1949 closed out with trade in APAP totaling less than 500 pounds. Today it is a different story. Production at Zeeland, Mich. is now counted by the ton and in the near future Sumner management esti-

* Preferred to more common "analgesic" by Lucas P. Kyrides, Sumner's research director and zealous guardian of Greek etymology.

mates market demand will be edging a million pounds. Appearance of Monsanto and Calco Chemical (American Cyanamid Co.) in the market, late in 1950, is evidence of more than an academic interest in the product.

Pegged at $3 a pound several months ago, price has dropped steadily as production increased, until it now is fairly secure at $1.50. Of course, price is tied to the cost of raw material, p-aminophenol, which incidentally has recently jumped 10 cents a pound.

At the $1.50 price, APAP will never threaten the aspirin tablet, but no one expects it to. It will probably find wide use as an ingredient of special preparations (such as aspirin-phenacetin-caffeine) for the relief of headaches and assorted minor aches. A product of this type already on drug store shelves is Squibb's Trigesic, in which APAP, not phenacetin, is the pain-chaser.

If this is an omen of a trend to switch to APAP, it will not come as headache-free news to manufacturers reaping the annual $3 million phenacetin harvest. However, their pain threshold is boosted by their ability to make both phenacetin and APAP without major revamping of existing facilities.

Citric Surge

By summer Chas. Pfizer & Co. will double citric acid capacity at its Groton, Conn., plant. Miles Laboratories (Alka-Seltzer), which consumes a sizeable portion of current output, hopes to be producing its own acid at Elkhart, Ind. by July 1. Miles will use submerged fermentation, whereas Pfizer is putting its money behind this process and the established tray-fermentation method. Pfizer has been using both processes at Groton for some time and both are being expanded.

Except for a small amount (2.5 million lbs. last year) produced from citrus fruit wastes, citric acid has long been Pfizer's domain. Despite that fact (Pfizer had 93% of the business last year), the company, endowed with plenty of business acumen, has kept the price level low. As a result of this and other factors, production has shown a steady increase, climbing from about 10 million lbs. per year in 1930 to an estimated 35 million lbs. last year. At a price level (voluntarily frozen by Pfizer last August for a year) varying upwards from 24.5¢ per lb. in car lots, it adds up to a $10-million-a-year business.

Growing markets: Alka-Seltzer and similar stomach settlers are one of the largest outlets, but citric's major use is as an acidulant in carbonated beverages (7-Up), jams and jellies and other foodstuffs. It acts as a stabilizer for frozen foods, and has various industrial uses—acetyl tributyl citrate is an excellent vinyl resin plasticizer and citric acid is an excellent sequestering agent. Stable and expanding, such markets are ideal outlets for chemicals.

It's natural then that other companies should eye citric; and Merck, Stauffer, Heyden, Commercial Solvents and Miles all did laboratory work. Several went as far as the pilot plant. But they all boggled at tray fermentation and Pfizer's 27-year competitive edge.

Tray vs. tanks: To offset this advantage, Miles turned to submerged fermentation to convert sugar to the desired product. The hitch is to provide the "catalytic" organism, Aspergillus niger, with plenty of air. In the tray process, air is circulated for 9-12 days over hundreds of shallow trays filled with molasses-derived sugar solution. In the new Miles process, air is bubbled through the fermentation medium—much as in penicillin and streptomycin production.

Tray fermentation has its drawbacks: Filling and emptying hundreds of trays is no small job; the trays aren't cheap; and the fermentation takes a week and a half.

Not easy: But submerged fermentation is no cinch either. Finding the optimum fermentation medium was a needle-in-the-haystack search. Trace elements, too, are a headache. Iron and zinc, for example, must be present in small, carefully controlled concentrations, while cobalt and lead must be absent (U. S. Pat. 2,492,673). Low conversion to citric is characteristic of the process; pure (but costly) sugar gives decent yields, but the process fell flat on its face with impure sugar-containing feedstocks—the only economically practical raw materials—until Miles struck pay dirt.

Process details haven't been divulged but patents provide some clues: To provide proper concentrations of trace elements in a molasses feedstock, Miles proposes (U. S. Pat. 2,492,673) to use cation-exchange resins. Miles has also found that the addition of morpholine and ammonium carbonate (U. S. Pat. 2,476,159) increases the yield of citric and cuts conversion time.

Citric surge: Capacity of Miles's plant has not been publicized, but best guesses place it at about 5 million lbs. per year, with provision for easy doubling of that figure. That together with Pfizer's expanded capacity adds up to a citric surge. Pfizer's current expansion at Groton, which will double present capacity, is its third at that location since World War II. Citric is still being made at Pfizer's Brooklyn plant, but the New York City water shortage and a long term decentralization policy decreed expansion at Groton instead.

By year's end citric capacity will be over 50 million lbs. That sounds like a lot, but it may not be enough for a rapidly expanding economy. If not, you can look for other companies to join in the game with their own versions of submerged fermentation.

Break for Utah

Curtailment of civilian use of natural rubber is a blessing for Utah gilsonite miners. The microcrystalline hydrocarbon product they take out of the ground in the region of Bonanza and Eureka (Uintah County) is widely used in the manufacture of asphalt-based floor coverings and as a substitute for rubber in battery cases. It is also used in paints and lacquers and is being introduced in sizable quantities into Salt Lake Refinery Co.'s (Standard Oil of California subsidiary) crude oil pipeline.

The American Gilsonite Co., also a Standard of California subsidiary, controls over three-quarters of the Utah gilsonite output, and—since the hydrocarbon has not been found elsewhere in the U. S.—three-quarters of the national output as well.

Open pit mining: In the past two years, open pit mining methods have been adopted to work the gilsonite deposits near both Eureka and Bonanza, with production reported at somewhat over 62,000 tons annually. The changeover from underground mining to pit mining has greatly reduced production costs; but the gilsonite operations still suffer in competition with asphalt products from refineries. The hitch: freighting difficulties. Operators estimate that the freight on gilsonite shipped East from Utah equals the value of the material itself.

Electrodes, too? Nevertheless, it's a good bet that rubber controls and lower asphalt production will open up a healthy market for mine tonnage. And an ace up gilsonite's sleeve is the fact that it makes an excellent coking material for the production of electrodes used in the aluminum industry. With aluminum slated for higher output, gilsonite may wax prosperous.

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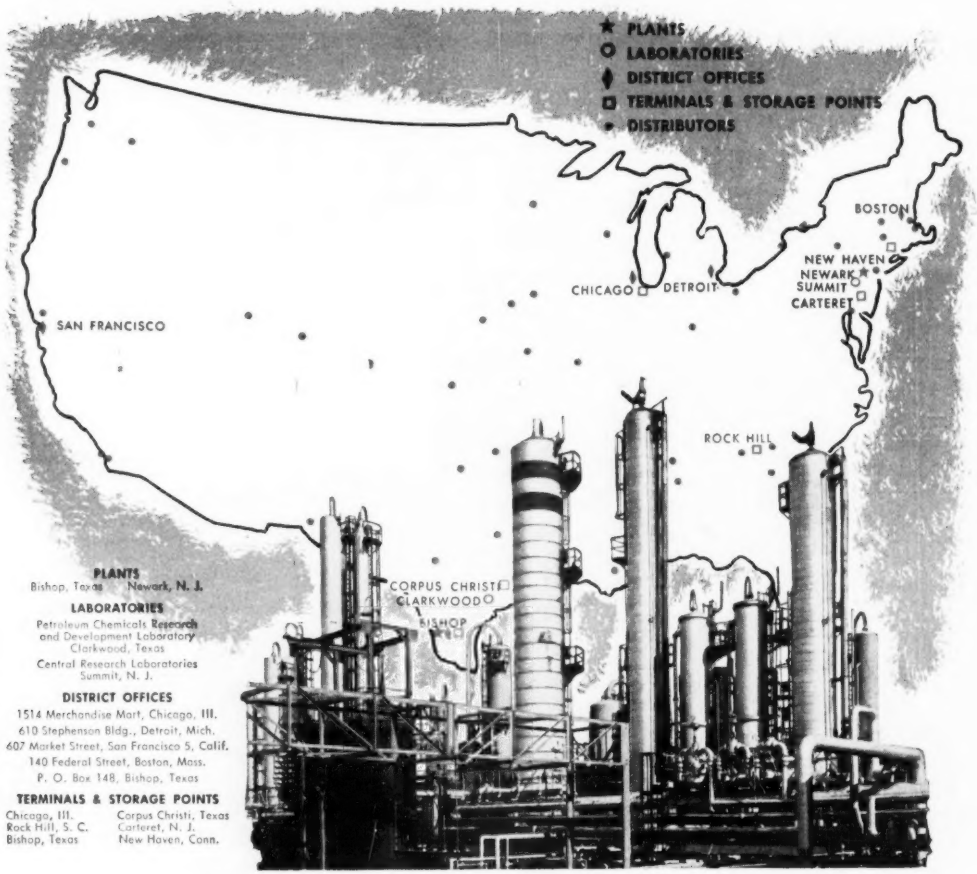

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White Graphite

Boron nitride of high purity is now being made by Norton Co. for experimental applications: Price is $125/lb.

Like graphite in crystal structure and lubricating ability, it differs in being white and a non-conductor.

Unequalled as an anti-sticking agent for glassmakers' steel molds, it is also potentially useful as a refractory, insulation for induction furnaces, lining and lip coating for crucibles.

GUY FETTERLEY: Almost like two carbon atoms.

Norton's interest in boron nitride is not surprising, for the company is an old hand at boron chemistry. It developed and introduced boron carbide in the 30's, and in 1944 turned out its first experimental batch of boron nitride. The early work on this novel compound was an outgrowth of Norton's connection with the Manhattan Project.

Research continued during the intervening six years at Norton's Chippawa, Ont. labs under the direct supervision of scholarly research engineer Guy Fetterley. Having perfected a process for making a product of hitherto unequalled purity, Fetterley can now write finis to the first act and start working on act two—emergence of boron nitride as a commercial chemical.

Although several substantial obstacles (chiefly, a $125/lb. price) bar boron nitride's emergence as a large-poundage commodity, the chemical's unusual properties may overcome some of them.

3+5=4+4: Not entirely unexpected by a chemist is its resemblance to graphite. The boron atom has three outer electrons—one less than carbon; nitrogen has five—one more. Put them together, and the result is very much like combining two carbon atoms. Consequently, boron nitride is quite similar to graphite, except that it's white and a nonconductor of electricity. The micron-sized powder is greasy (and thus, like graphite, a good lubricant); its X-ray pattern and crystal structure are almost identical with those of graphite; its melting point (in the vicinity of 3,000 C) is very high; and its mechanical properties are much the same. It can't, however, be sintered or pressed into coherent structural shapes as can boron carbide.

Its nonconductance, together with its low bulk density and the fact that it is not affected by induction, makes it a theoretically ideal insulation material for induction furnaces. It is stable in inert or reducing atmospheres almost to its melting point, but air oxidizes it at red heat. Oxygen-containing gases and vapors (e.g., carbon dioxide, water) also will oxidize it, and it is slowly hydrolyzed by boiling water or dilute acids to ammonia and boric acid. At 2,000 C it reacts with carbon to form boron carbide and nitrogen. It is apparently unaffected, however, by carbon monoxide.

High purity: Norton's process, still under wraps, may likely be one or a combination of the three known processes: reaction of (1) ammonium chloride and borax; (2) ammonia and boron trichloride (described in German literature); (3) ammonia and boron oxide (English patent). Whatever its process, Norton has succeeded in making a product of 96% purity or better—higher than has ever been possible before*—from readily available raw materials.

Boron nitride is currently sold—not only by Norton, but also by Fairmount Chemical Co., Cooper Metallurgical Associates, Molybdenum Corp. of America, and Johnson & Scudder—for prices ranging from $40 to $250 a pound, depending largely on purity. Norton's price is $125. It's doubtful that the price can ever go below $20-$30, regardless of production rate.

No Threat: At that level it's no threat to graphite—or to other refractories, for that matter—where such materials can be used. One potential application that has been mentioned, for example, is a silicone "oil" suspension for high-temperature lubrication. Whether boron nitride would be better than graphite in that particular use is still an open question.

But there are places where boron nitride is superior. It can't be beat as an anti-sticking agent for glassmakers' molds; and it's an essential component of Ignitron (rectifying tube) igniters. New uses can normally be expected to develop as material of uniform quality and price is made available. Straw in the wind: a prominent spark plug manufacturer has investigated the product as a refractory.

Norton is avidly exploring such potential markets (another one: crucible linings and lip coatings), and it envisions stepped-up production at its Chippawa, Ont., plant (to be sold, however, by Norton Co., Worcester, Mass.) as markets develop.

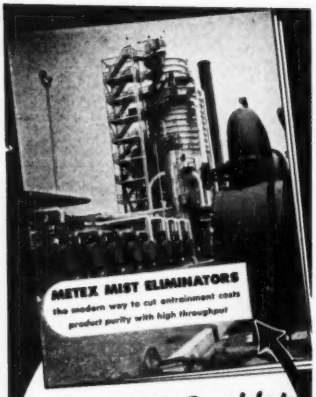
* Reported purity figures for boron compounds are always approximate since precise analysis for boron is difficult.

Rainbow Resins

Re-creation of old Italian violin varnish has led to pilot-plant production of new transparent, colored varnish resins based on metal resinates. Several varnish makers are now evaluating them in formulations.

The new resins are the culmination of research by Joseph Michelman (Michelman Chemicals, Inc.) on the varnish used by 17th-Century Italian violin makers. Named Kolorez resins, they're now in pilot-plant production (100 lbs. a day). Several paint and varnish companies are experimenting with them, and they're potentially useful in varied application, particularly in the field of protective and decorative finishes for quality furniture.

Versatile: Kolorez resins have properties that qualify them for a variety of uses. They are soluble in a number of solvents, particularly aromatics and ester-type solvents and plasticizers.



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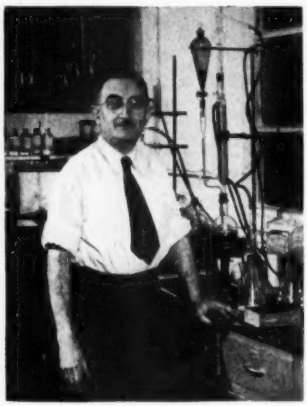

JOSEPH MICHELMAN: Television sets in Stradivarius cabinets?

Characteristic of films produced from solutions of these resins is their transparency and color. Available in red, blue, yellow, green, orange, brown, black, and purple, the resins are compatible with many ingredients, especially nitrocellulose. While they have some film-forming ability themselves, they are too brittle for use in the unplasticized state.

It is meaningless to compare Kolorez resins with existing resins solely on a price basis, for an increase in resin cost must be weighed against the unique properties of the formulations. Also, the present price, $1.10 to $1.40/lb. depending on color, reflects pilot-plant production; commercial manufacture will push the level down considerably.

A Lost Art: Michelman started off with the idea of investigating and reproducing the Cremona varnish, which is the varnish that Stradivarius and the other old masters used on their violins. The varnish is entirely transparent and was produced in a variety of colors from deep red to golden yellow. It enhanced not only the beauty of the instrument but, claim many experts, the tonal qualities as well. The process for making the varnish had vanished in the early 18th Century and has been considered a lost art.

After eleven years of delving through the old literature and after countless experiments, Michelman published a book, "Violin Varnish," in 1946. In it he reported that he had been able to reproduce the transparency, color, and texture of the Cremona varnish, but could not be certain of his results until he had a sample of the original for comparison. On publication of his book several samples were made available to him and his analyses seemed to indicate that here indeed was the actual Cremona varnish.

The reaction of violin makers and dealers ranged from mild skepticism to downright disbelief. One of them, on being asked for his opinion on the authenticity of the reproduction, was in no hurry to put himself out on a limb. "In two, three hundred years people will be better able to give an opinion," was his reply.

Ready to Go: Michelman had no intention of waiting that long. He has modified and improved the basic resin, which is a metal resinate, by a careful combination of modern technology with ancient art. At the drop of a hat he will be ready for full-scale production.

Experimentation and evaluation now under way by prospective buyers will determine what niche these resins will occupy in the industrial field. Michelman envisions use of Kolorez resins in plastics, lacquers and varnishes for furniture of all types, and suggests it for formulating printing inks. He poses a leading question calculated to excite commercial interest: "Wouldn't you like your new television set in a cabinet comparable in finish to an old Strad?"

Lavish Aroma

Isopropylmercaptan, new Bureau of Mines chemical, is used as standard for petroleum analysis. Its fabulous price and foul odor are not exactly conducive to commercial development. Yet current lack of industrial utility is no yardstick for gauging future value.

Thiophene, a comparably pungent cousin, sulked in the shadows for years before the advent of the antihistamines transformed it into a useful industrial commodity. Although the prohibitive price (because of extreme purity) is an undeniable commercial roadblock, isopropylmercaptan might well be a sleeper if one considers the variety of profitable applications for related sulfur compounds.*

The Bureau of Mines synthesizes the compound at its Oil-Shale Experimental Station in Laramie, Wyo., in cooperation with the American Petroleum Institute, which helps finance some of the Bureau's work on sulfur chemicals. Because of its high purity (99.9%), the product finds use in testing equipment as a standard for the determination of various chemicals

* In manufacture of rubber, dyes, pharmaceuticals, plastics, detergents, gas odorants, etc.

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found in petroleum. So far two quarts of the material tagged $210 an ounce have been made. The American Petroleum Institute bottles the fluid in 1/16 ounce vials and sells to research laboratories, equipment manufacturers, and universities.

Phosphonate Key

Commercially available for the first time, three organic phosphorus chlorides are potentially valuable intermediates in the synthesis of insecticides, plasticizers, hydraulic fluids, and other important commodities. Although actual uses are still in the development stage, general availability should spark further interest in their industrial applications.

Pioneered in the laboratories of the Victor Chemical Works, Chicago, benzene phosphorus dichloride, oxydichloride, and thiodichloride have the distinction of being the only commercially available intermediates which can be used to introduce phosphonate groups into organic compounds.

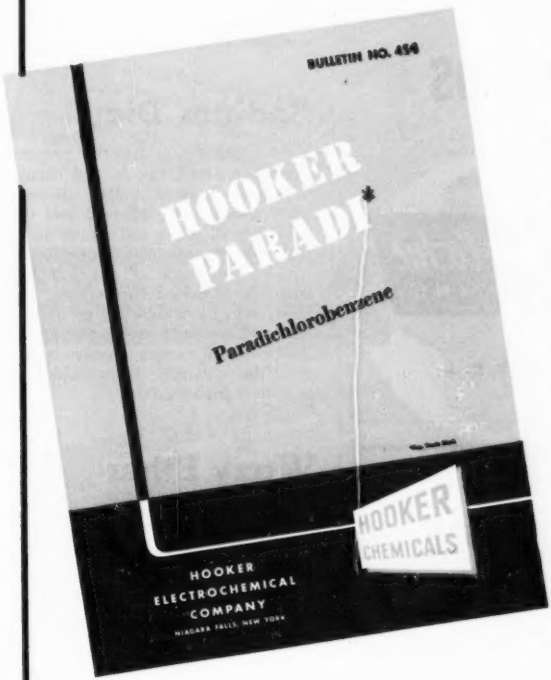
Not long ago, their status as chemicals of commerce was literally up in the air. Washbowls on commercial airships formerly made of plastic (to save weight) did not stand up under continued hot water inundation. Within a short time they developed sags and bulges. A plasticizer made from one of the phosphorus trio banished the bulge by endowing the plastic with considerable heat resistance. Since then, different plastics have been enlisted for this pob and this particular application is now passe.

Other Uses: All this took place while the intermediates were still in limited supply. Subsequently other, more significant uses for these unique chemicals have come to light in the manufacture of anti-foam agents, hydraulic fluids, polymers, oil additives, insecticides, anti-oxidants, fire retardants, and new phosphonate plasticizers. Although most of these products are still in development, Victor's recent switch to commercial production of the phosphorus chlorides is a good sign that a healthy demand may be just around the corner. The company itself is using one of the intermediates in the synthesis of a monomer called Phoresin which is currently being offered for evaluation.

Upping Output: Prior to 1942, when Victor chemists worked out a feasible method of preparation, these phosphorus compounds were little more than chemical oddities. A year later they went into the pilot-plant where most of the kinks were ironed

Send for this Guide to Increased Profits

with Hooker Paradichlorobenzene



HOOKER's new Bulletin No. 454 on Paradichlorobenzene can be your guide to increased sales and profits if you are interested in the fumigant, deodorant and disinfectant markets. It describes the many uses and application of paradichlorobenzene, methods for reforming and repackaging—contains a table and illustrations of exact screen sizes—just the information a repackager or specialty manufacturer needs.

Hooker Paradichlorobenzene is a crystal clear, high purity product that evaporates completely, leaving no residue and no stains. It is not injurious to fabrics, furs or hides and is not poisonous to human beings.

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Appearance	White to clear transparent
Form	Crystals in 7 sizes
Melting Point	53°C
Boiling Point	173°C
Residue on Sublimation	None
Shipping Containers	25, 50, 100, 200 lb. Fibre Drums

A request on your company letterhead will bring this bulletin to you promptly. Chemists who are interested in other physical and chemical properties should ask for Technical Data Sheet 749.

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CHILL-VACTORS STEAM JET EVACTORS CONDENSING EQUIPMENT

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out, permitting output in December, 1950, at levels conducive to commercial interest. Process development is continuing as the company is anxious to reflect production improvements in selling price, to broaden the scope of industrial application.

Production is at the firm's Chicago Heights, Ill., plant. Acidic and highly reactive, the liquids must be handled with respect. Sold in technical and refined grades, these unique intermediates promise to extend the use of phosphorus to a wider range of commercial products.

Sodium 'Dicy'

An intermediate for the preparation of pharmaceuticals and chemotherapeutic agents, sodium dicyanamide retards embrittlement and discoloration of paper and proves an effective moth repelling agent. Now in trial-lot production at American Cyanamid's Stamford, Conn., lab, this new product is a colorless, crystalline, water-soluble solid, melting at 315 C. Reactive with sources of active hydrogen, the chemical is available for industrial investigation.

Waxy Ether

A pilot-quantity compound today, dicetyl ether's versatility gives promise of bigger things in the future. Recent addition to the Humphrey-Wilkinson line of long-chain aliphatics, the soft, waxy, non-toxic material is suggested as a plasticizer, water-repellent impregnating agent and oil additive, plastic molding lubricant, dielectric, perfume fixative, and cosmetic constituent.

Although currently a small-scale item going for about $3 a pound (refined, in drums), output will be boosted on short notice when demand materializes.

"Bacterial library" is about the best term to describe the British national collection of industrial bacteria cultures, maintained at the research labs of the Dep't of Scientific and Industrial Research.

Microorganisms are represented by 470 different strains used in solvent production (i.e. acetone), cheesemaking, bio-assays, and other industrial operations.

Culture vitality is preserved by chemical nutrition where possible, although several varieties are kept dormant by freeze-drying.

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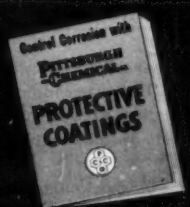

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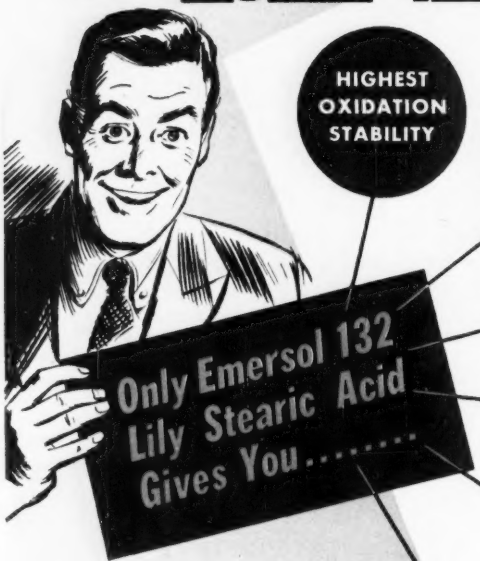

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So in 1940, the Tousey Varnish Company made it standard policy to ship their products in drums equipped with *Tri-Sure Closures**.

Tri-Sure Closures assure the success of a vital step in the marketing of liquid products. They provide—with a *leak-proof, tamper-proof* closure—perfect security from spoilage and losses in transit.

Tri-Sure protection *always* pays, because it can be costly to be without it. On *your* next drum order, specify "Tri-Sure Closures". Your drums will be delivered to you equipped with Tri-Sure Flanges and Plugs; you apply the Seals.

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CLOSURES

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The photograph above is reprinted from "65 Years of Achievement", with the permission of the Tousey Varnish Co.

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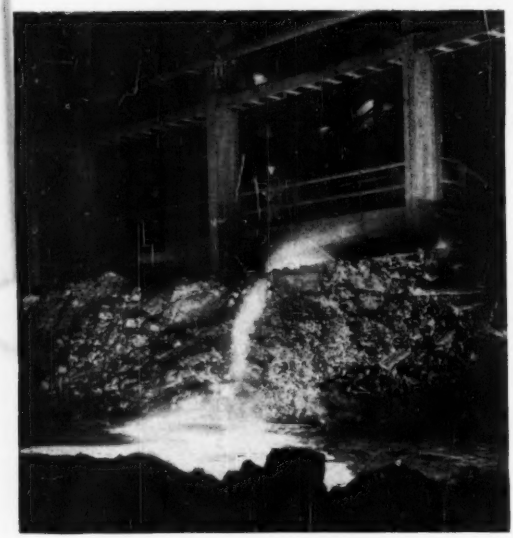
1 PHOSPHATE-BEARING ROCK near plant is strip-mined by means of a drag line. Trucks carry rock to plant.

2 ROCK IS WASHED and sintered before charging to furnace for reduction with coke. Sand provides flux.



5 MOLTEN SLAG flows into pit, where it hardens to a glass used in glass manufacture, fertilizers and road beds.

6 FERROPHOSPHORUS is important by-product present in slag. Shown here as pigs, it goes into special steels.

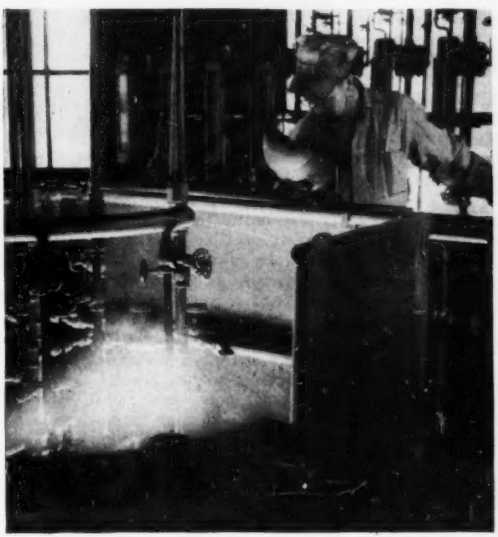
PRODUCTION....

"Big Sixth"

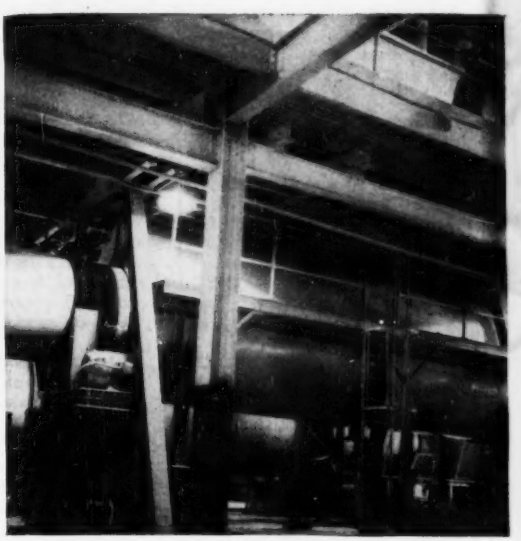
Slated for completion this week is Monsanto Chemical Co.'s sixth and largest phosphorus furnace at Monsanto, Tenn. Drawing 25,000 kilowatts, the furnace is the largest phosphorus-producing unit in the world. Output will be close to 50 tons a day, or something over 15,000 tons a year.

3 EXIT GASES contain poisonous fluorine compounds. Scrubbing unit, which cost $750,000, removes the element.

4 WORKMEN TAP SLAG from furnace. Slag, mainly calcium silicate, results from reaction of sand with the rock.



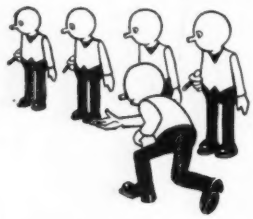
7 ELEMENTAL PHOSPHORUS is burned at acid plant to phosphorus pentoxide, which with water gives acid.



8 VARIOUS COMMERCIAL PHOSPHATES are derived from acid. Here is tetrasodium pyrophosphate unit.

Known as the Big Sixth, the new furnace will turn out almost a third as much phosphorus as the earlier five combined, and it will keep Monsanto well in the forefront as the largest domestic producer.

Where is it all going? Fastest-growing outlet is phosphate builders, spurred by the detergent boom (*CI, June 1950, p. 832*). Monsanto ships the 99.9%-pure furnace product in tank cars (under a protective layer of water) to its acid and phosphate plants at Monsanto, Ill., Carondelet, Mo., and Trenton, Mich. Destination from there: everywhere.



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PRODUCTION . . . . . .

All in Glass

All-glass bubble cap columns will sell at about the same price as stainless steel columns. Corning Glass Works is making them with its multiform process.

Small ones (4″ and 6″) were made first. Now a 23½″ column has been added to the standard line.

Among applications foreseen: distillation of corrosive materials, sensitive monomers.

The new columns mustn't be confused with the all-glass, 23½″ columns Corning has supplied for over 20 years. Although they were available—more or less on special order—the orders didn't break the mailman's back.

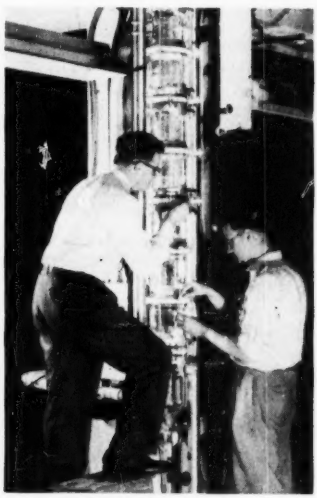
Reasons: The caps were hard to make and hard to hold in place; the assembly and operation of the column took a lot of care; the resultant price didn't remind anyone of a bargain basement. Consequently, a company's purse had to be pretty big before a glass column could even be considered.

Then the multiform process for making glass came along, and complex glass shapes became comparatively easy to make. After some five years of pondering, Everett Kelm, senior engineer in Corning's Product Engineering Department, sat down about a year ago and designed a glass column with one-piece bubble plates. With an assist from Julian Smith, chemical engineering professor at Cornell University, the first 6-inch column was put together and tested in Cornell's Chemical Engineering Laboratory in the summer of 1950. It worked fine, and now columns of three sizes—4-inch, 6-inch, and 23½-inch—are standard items with Corning Glass.

For the first time a glass bubble-cap column can be treated much like any other. Plate, caps, and chimneys are fused together into a single strong unit. The plates are held between short cylinders of tempered glass pipe; the ends of the column are standard glass reducing tees, with tempered inlets and outlets. The downcomers of glass tubing are adjustable; the plates carry thermowells and sample taps for both liquid and vapor. The gaskets between the plates and the cylinders are asbestos, rubber, or Teflon.

The small columns give very high plate efficiencies, the 23½-inch unit is expected to behave much like a metal column of the same diameter.

Low Cost: Price of the glass column is very nearly the same as that of a stainless steel one. Maintenance cost should be lower than that for comparable metal columns because of the corrosion resistance of glass.



KELM AND SMITH: The six-incher has a big brother.

Corning now thinks it has a reasonably priced column of real value for distilling corrosive materials. Other people think so too. Several companies—some large, some small—have bought 6-inch columns for small-scale production and also for training still-house operators and supervisors. One application has been in distilling the monomer for a special grade of plastic; the stuff isn't corrosive, but contact with metal is strictly taboo. Universities are using them, too, for showing students what goes on in a bubble-cap column; one university alone has ordered three columns.

No Freak: Success with the smaller column induced Corning to add the monster 23½-incher to its line just a few weeks ago. Several companies are already nibbling at the bait, and sales are expected to come soon and

often. Says Ev Kelm: "This glass column's no freak. It puts glass to work where glass is needed most. What's more—it does a job."

Karbate Pumps

Price of Karbate (resin-bonded impervious graphite) centrifugal pumps is down about a third from last month's level.

With this reduction the National Carbon Div. of Union Carbide & Carbon Corp. has made the first cost of Karbate pumps competitive with those made from corrosion-resistant alloys, such as stainless steel. This greatly increases the potential scope of Karbate pump application.

No longer must one alloy be specified for pumping carbon tetrachloride; another for pumping hydrochloric acid; and another for pumping inorganic salt solutions. Karbate pumps can be used interchangably for any of these services, an important consideration in these days of developing equipment shortages.

Teflon and Karbate: Resistance to corrosion by such a variety of materials is provided by use of only Karbate or Teflon in contact with the material being pumped. The Teflon seal replaces the neoprene seal used in the older models of these pumps.

However, all of this doesn't add up to a pushover for Karbate. Its brittleness can be a limitation and, of importance over the long run, the operating efficiency of Karbate pumps is not as high as that of metal pumps.

Nickel Price Rollback: International Nickel Co. has rolled back the price on U.S. mill products from Canadian nickel from ½¢ to 5¢ per pound, in accordance with the Economic Stabilization Agency's request for a voluntary price freeze. Price reductions on Monel in sheet and rod forms are 1¢, for rolled pure nickel, 2½¢. The decreased prices are retroactive to December 13 when the price was last increased.

Filtering Membrane: Clogging is said to be reduced by Titeflex Inc.'s new cylindrically shaped wire screen filtering membrane. The screen is so woven that the triangular cross-section of the individual wires, in backwashing, provides the maximum velocity of flow at the point of support of the filter cake, the actual filtering medium. Various sizes are available and any alloy can be used that can be drawn into wire.

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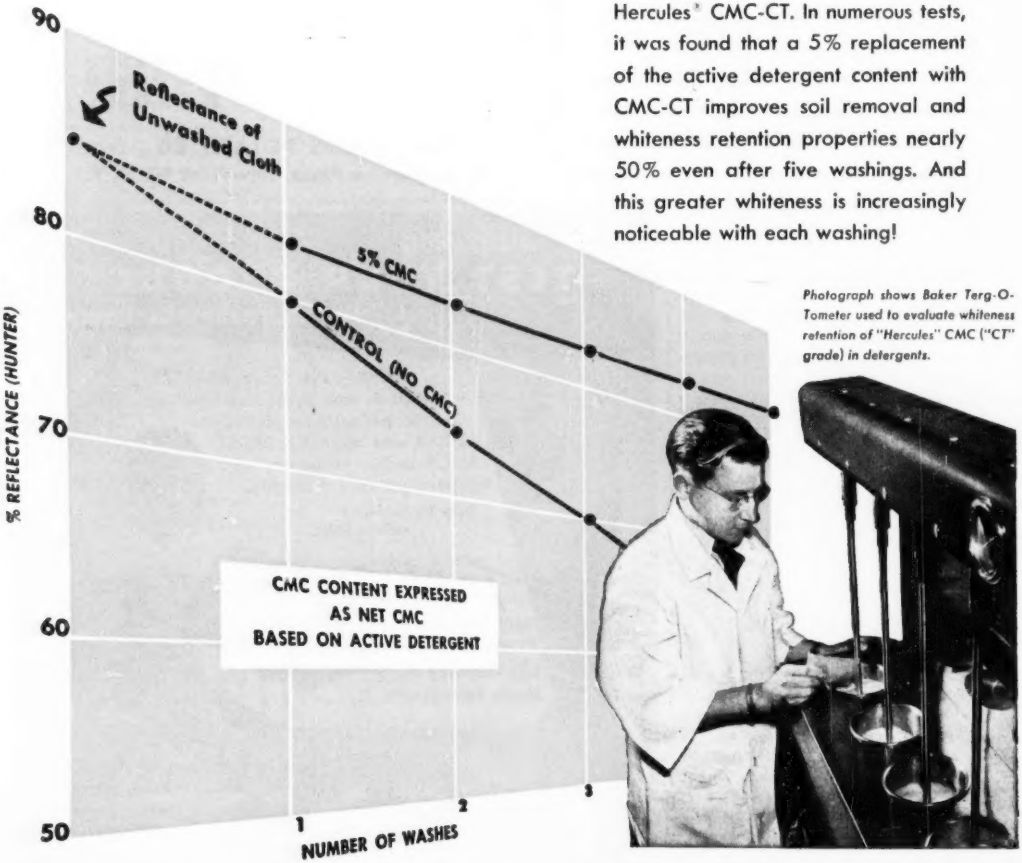
PROBLEM...

. . . to help manufacturers of "soapless soaps" produce detergents which would wash clothes whiter by preventing the washed-out dirt from being redeposited.

SOLUTION...

. . . a special grade of cellulose gum, Hercules® CMC-CT. In numerous tests, it was found that a 5% replacement of the active detergent content with CMC-CT improves soil removal and whiteness retention properties nearly 50% even after five washings. And this greater whiteness is increasingly noticeable with each washing!



Photograph shows Baker Terg-O-Tometer used to evaluate whiteness retention of "Hercules" CMC ("CT" grade) in detergents.

SYNTHETIC RESINS · CELLULOSE PRODUCTS · TERPENE CHEMICALS · ROSIN AND ROSIN DERIVATIVES

Detergents represent only one group of products improved at low cost by the addition of small quantities of "Hercules" CMC. Many others, ranging from pharmaceuticals to paperboard, can be made better with cellulose gum.

Purified CMC is unsurpassed among water-soluble colloids for its combination of thickening, suspending, film-forming, and stabilizing properties. In emulsion paints, it controls viscosity and suspends pigments. In textiles, it does a better, faster job in warp sizing; improves textile printing pastes. In the paper industry, it increases the strength of paper and board, improves finish and printability. We would like to tell you more about "Hercules" CMC ("CT" or Purified Grades), and the opportunities its diverse properties offer in developing new products or improving existing ones.

HERCULES POWDER COMPANY 992 Market St., Wilmington, Del.
Sales Offices in Principal Cities

RESULT...

. . . detergents which not only get clothes whiter and keep them whiter through many washings, but cost less to make. By reducing the amount of active detergent needed, this grade of CMC permits the generous addition of cheaper alkaline builders.

Brick Defoamer Stops Waste

Introduced to the paper industry only a few months ago, "Defoamer 4" in 2½ lb. bricks has already gained wide acceptance. Easy to use, easy to handle, it eliminates waste, mess, and drums. One brick dispersed in water makes 40 gallons of defoamer liquid. Send for free sample brick.

Versatile Resin Alcohol

Hercules Abitol®, a highly saturated primary alcohol derived from rosin, is finding increased use as an intermediate in the manufacture of oil additives and as a modifier in alkyds. Its viscous balsamic nature and pale color also make it useful in specialty adhesives and printing inks. Send for testing sample.

New Water-Base Lacquer

In this recent Hercules development, ethyl cellulose, nitrocellulose, or cellulose acetate are dispersed in an equal weight of water and ground to a particle size of 4-5 microns. Applied to surfaces and heated, the hydrosol dispersions dry and fuse to a continuous film. Modifiers can be added directly to the dispersions. Advantages include the elimination of volatile solvents and an increase in solids content. These dispersions are presently available in research quantities only.

Extends Scarce Phenolics

In molding materials and many other formulations where dark colors are satisfactory, Vinsol® can replace up to 30% of the phenolic resin—without any appreciable sacrifice in physical or chemical properties. Currently priced at less than 5¢ per pound, this dark-colored, high-melting thermoplastic also offers substantial savings in total resin costs. Send for generous testing sample and specific technical advice.

"HERCULES," "DEFOAMER 4," "ABITOL," AND "VINSOL" ARE HERCULES TRADE-MARKS

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IN 1951

. . . pack your crushed, powdered, or granulated Chemicals in Raymond Multi-Wall Paper Shipping Sacks.

YOU SAVE TIME—because Raymond Shipping Sacks pack faster, are quicker to handle. They're easier to stack.

YOU SAVE TROUBLE—because there is a minimum of handling and seepage loss.

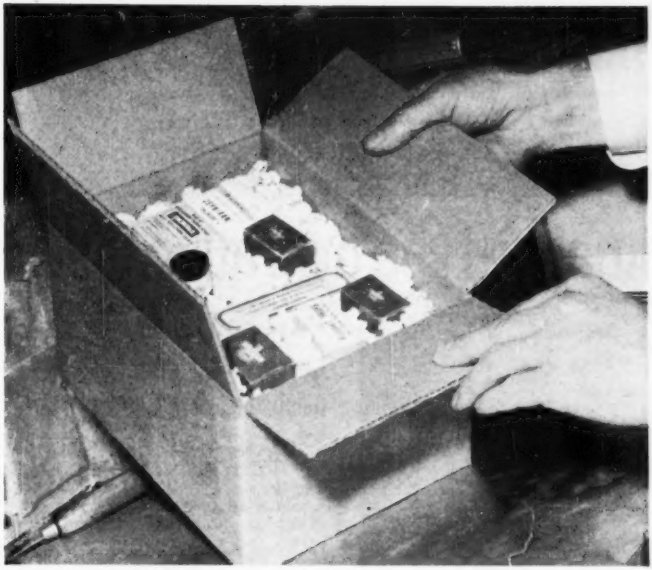
YOU SAVE MONEY—because Raymond Shipping Sacks have a lower unit cost than many other types of containers.

They are CUSTOM BUILT in a variety of types, sizes, and strengths to meet the packer's and shipper's individual requirements.

THE RAYMOND BAG COMPANY, Middletown, Ohio

RAYMOND *MULTI-WALL* **PAPER SHIPPING SACKS**

PACKAGING.....



POPCORN PROVIDES SOFT BED for fragile items opened after a fall of 60 feet.

Popcorn Packing

Good old-fashioned popcorn now has a new job . . . as a packing material for fragile shipments. Last week Winthrop-Stearns Inc., having already obtained Post Office permission to use popcorn as a packing material for bottles of pills and expectant of securing shortly the same clearance for shipments of liquids, introduced popcorn packaging at its Rensselaer plant. One preliminary estimate predicts an annual saving of $25,000 on these operations alone. At first popcorn packing will be confined to parcel post and air express shipments. But expansion to all shipping operations looks like a good bet.

Idea hits: The idea of popcorn as a packing material is the brainchild of Albert Rausch, enterprising traffic manager for W-S. It came as the result of a long search for possible substitutes for shredded paper.

Tests made by Rausch show that popcorn offers greater protection than shredded paper. Another advantage is that it can be fed into the shipping container mechanically whereas the paper involves hand feeding. Greater protection means less breakage and the extremely low bulk density results in lower shipping charges.

Tests prove: The tests by which the popcorn packing was evaluated were thorough and revealing. Most dramatic by far was the one in which two representative glass shipments in double faced corrugated pasteboard containers were dropped from the roof of the Winthrop-Stearns warehouse to the asphalt pavement sixty feet below. One shipment was packed in 10 ounces of popcorn, the other in 24 ounces of conventional shredded kraft paper.

When the test boxes were opened after the drop, not one of the bottles in the popcorn-packed container was broken. But one-third of the contents of the paper-packed box was found smashed.

Cheap too: Availability of raw material is another fact that argues for popcorn packaging. Cheap corn with no foreseeable shortage contrasts very favorably with the tight and ever-tightening paper situation.

One objection might seem to be that popcorn would attract rodents and vermin. But Rausch is sure that this will be no problem. The inventor explains that the popcorn used is unbuttered and unsalted and holds no attraction for these warehouse invaders. For proof of his contention he points to the paper bag that has lain beside his desk on the warehouse floor for three months. . . . Not one kernel is missing.

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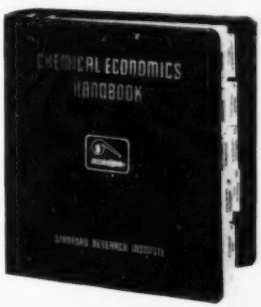

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MONSANTO
CHEMICALS — PLASTICS

FOR YOUR INFORMATION

Every month Monsanto publishes these pages of pertinent information. Here you will find suggestions and application ideas selected to help you improve your products, lower your production costs, increase your sales. More information will be furnished on request.

NEW—Nonflammable-type hydraulic fluid

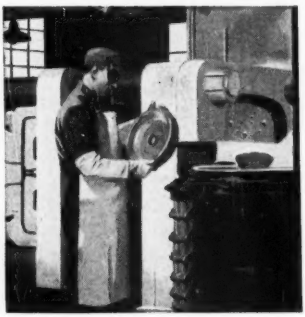
Monsanto Pydraul F-9 has high lubricity and excellent pumping characteristics

Greater safety for employees . . . longer service and efficiency from machines . . . economy in operation. Those are the advantages offered to industry through the use of Monsanto's new hydraulic fluid, Pydraul* F-9. Pydraul F-9 is known as Hydraulic Fluid F-9 to industries which have tested and are using the product.

Pydraul F-9 is a nonflammable-type fluid developed primarily for use in die-casting machines, hydroelectric turbines, glass drawing machines, hydraulic presses and other equipment that requires a fluid power-transfer medium.

Safety, the major advantage of Pydraul F-9, comes from its nonflammability. This characteristic eliminates the fire hazard of ordinary hydraulic fluids, protecting workmen, machinery and buildings.

Economies come from the use of Pydraul F-9 because of its high lubricity, its high resistance to shear and mechanical breakdown, and because it does not corrode metals ordinarily used in machines employing hydraulic pressure. These qualities mean longer life for the fluid and less maintenance on machines.



SAFETY, ECONOMY, EFFICIENCY

These are the results of using Monsanto Pydraul F-9 in equipment requiring a fluid power-transfer medium.

Monsanto Pydraul F-9 resists shear and mechanical breakdown

The efficiency of Pydraul F-9 has been proved in the laboratory and in actual service.

Look into the safety, economy and efficiency offered by Monsanto Pydraul F-9. You can get complete details by contacting any Monsanto Sales Office, or by mailing the coupon for a copy of Monsanto Technical Bulletin No. O-D-602.

The technical bulletin gives the physical and chemical properties, corrosion and oxidation stability, four ball-wear tests, effect on elastomeric materials, lubricity tests, and a series of tests which prove the nonflammability of Pydraul F-9.

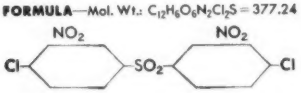
Monsanto Pydraul F-9 now is available in commercial quantities.

Research Chemists' Corner

NEW PRODUCT

BIS-(4-CHLORO-3-NITROPHENYL) SULFONE

FORMULA—Mol. Wt.: $C_{12}H_6O_6N_2Cl_2S = 377.24$



ASSAY—102% (Dumas nitrogen).
PHYSICAL PROPERTIES — Form: Cream-colored powder. **Melting Point:** 193-198°.
CHEMICAL PROPERTIES—Labile chlorine atom can be replaced by amino, hydroxyl, methoxyl, and anilino groups. Reactions with substituted diphenylamines lead to formation of acid wool dyes. Additional nitro groups can be introduced by treatment with KNO_3 and H_2SO_4.
SUGGESTED USES — Dyestuff intermediate. Organic synthesis intermediate.
TOXICITY—Not grossly toxic and only mildly irritating to skin.
AVAILABILITY—Research quantities.

NEW BOOKLET

This 16-page booklet gives specifications of 30 Monsanto Chemicals that appear to have possibilities beyond their present uses. Use the coupon to obtain your free copy. If you find new uses for any of the chemicals, you can be sure of ample supply for they now are in commercial-quantity production.

Monsanto Intermediates

In Monsanto's extensive family of intermediates are the following that can be shipped immediately. If you have need for any of these, place your order with the Monsanto Sales Office that serves you.

Meta-Nitrochlorobenzene	Meta-Chloraniline
	Ortho-Aminobiphenyl
Monsanto Salt (Sodium ortho-Chloro-para-toluenesulfonate)	Ortho-Nitrobiphenyl
	Toluenesulfonic Acid

These Monsanto Intermediates may or may not be available. For information on their availability, contact the nearest Monsanto Sales Office.

Benzyl Chloride	Ortho-Anisidine
Benzoic Acid, Technical	Ortho-Phenetidine
Cyclohexylamine	Para-Anisidine
Dicyclohexylamine	Ortho-Phenetidine
Dinitroaniline	Para-Chloroaniline
Dinitrochlorobenzene	Salicylic Acid, Technical
Ortho-Nitrochloroaniline	Thiourea

Two chemicals that serve the paper industry

Santosite* and Santobrite* are two Monsanto Chemicals that have proved themselves of great importance in the manufacture of paper.

Santosite (sodium sulfite anhydrous, technical) is employed in semichemical pulping, making it possible to pulp hardwoods, straw, cornstalks and agricultural residues. Mild-acting Santosite separates the lignin, the fiber of short-fibered hardwoods and other materials, without degrading the cellulose.

Santobrite (sodium pentachlorophenate, technical) has proved its effectiveness against microorganisms that plague the pulp and paper industry. It controls organisms that cause stain and decay in pulp logs, that degrade pulp lap, that spoil pulp stock. In the water supply, Santobrite controls slime. It prevents decay of felts. Spoilage of coating and sizing materials and mildew on finished products are prevented by Santobrite applications.

Santobrite is chemically stable, noncorrosive to metals, nonvolatile and practically odorless. Santobrite requires no expensive equipment in its application. When properly handled, Santobrite is not hazardous to mill operators.

Available literature: Technical Bulletin No. O-5, "Santobrite for Microorganism Control in the Pulp and Paper Industry"; booklet, "Santosite, the Milder Pulping Agent."

Sterox CD . . . a powerful nonionic detergent that gives you "controlled sudsing"

If you have a job for an efficient, low-sudsing detergent and wetting agent in your compound, Monsanto Sterox* CD is the product you need.

Low-sudsing, 100%-active Sterox CD is high in detersive efficiency over a wide range of concentrations and temperatures. It is effective in hard or soft water . . . over the entire pH range. Used in hard water, Sterox CD does not form insoluble soap scums which are detrimental in many industrial applications.

Nonionic Sterox CD blends easily and efficiently with anionic detergents and soaps . . . with cationic detergents . . . with alkaline "builders" such as phosphates, silicates and carbonates. Its efficiency is stepped up when compounded with "builders." Sterox CD also is used effectively with acid-type cleaners.

Sterox CD may be used wherever controlled sudsing is desired, for control of dusting, and in the following: laundry compounds . . . dishwashing compounds . . . metal cleaning and treating compounds . . . paint and wall cleaners . . . textile processing compounds . . . paste cleaners . . . barrier creams . . . floor cleaners . . . detergents for sanitation . . . liquid detergents.

For complete information on Monsanto's Sterox CD, mail the coupon for Monsanto Technical Bulletin No. P-129.

If plasticizers are hard to get, here's economical way to make them go farther

You can extend your primary plasticizers economically and still maintain your high quality by using Monsanto HB-40 (partially hydrogenated terphenyl) in vinyls, styrene dispersions and casting resins.

As much as 25% of low-cost HB-40, based on the weight of the plasticizers, can be used to extend higher-priced plasticizers in many vinyl formulations. In some styrene dispersions, HB-40 is the only plasticizer needed.

Monsanto's improved HB-40 is practically water white, making it an excellent extender for use in products that are clear or brightly colored. Properly stabilized clear and tinted vinyls, in which HB-40 serves as the extender plasticizer, have good light and heat stability. HB-40 is relatively nonmigratory and is considered very low in toxicity.

For complete information on the application of HB-40, mail the coupon or contact the nearest Monsanto Sales Office.

* * * * * * * *

MONSANTO CHEMICAL COMPANY, 1703-A South Second Street, St. Louis 4, Missouri. District Sales Offices: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

*Reg. U. S. Pat. Off.

Santomerse No. 1, Monsanto's all-purpose detergent and wetting agent, has many industrial uses

In industrial applications requiring cleaning, wetting out, penetrating or emulsifying, Monsanto Santomerse* No. 1 is both highly effective and economical.

Santomerse No. 1 may be used in cleaning compounds that are strongly alkaline or highly acid. In prepared alkaline cleaners, the incorporation of Santomerse No. 1 in the compound promotes rapid emulsification of oil films, uniform penetration and quick drain-off. In acid baths for cleaning, treating or pickling metal, small amounts of Santomerse No. 1 will improve the operation of the bath and raise the quality of the work.

A combination of Santomerse No. 1 and Monsanto Tetrasodium Pyrophosphate makes an outstanding compound for commercial wet-process cleaning of wool rugs. In this application, Santomerse No. 1 delivers thorough penetration, removes deeply imbedded soil and brightens colors without damage to the wool. Because of its free-rinsing properties, it is easy to remove the Santomerse No. 1.

For more details on these and many other industrial applications of Monsanto Santomerse No. 1, mail the coupon for a copy of the booklet: "Santomerse No. 1 . . . all-purpose detergent *and* wetting agent."

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CHEMICALS AND PLASTICS

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SEND INFORMATION:
- ☐ HB-40
- ☐ Bis-(4-Chloro-3-Nitrophenyl) Sulfone

SEND LITERATURE:
- ☐ Pydraul F-9
- ☐ 30 Monsanto Chemicals
- ☐ Santobrite ☐ Santosite
- ☐ Sterox CD (No. P-129)
- ☐ Santomerse No. 1

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Background for better detergents

More than a billion pounds of household and industrial cleaning compounds have been produced with synthetic detergent materials made by Oronite.

This broad acceptance is proof of the high regard which leading compounders, processors and end-users hold for Oronite products.

Large-scale production facilities and experience provide Oronite the background for better detergents and make Oronite a most important source of supply.

ORONITE CHEMICAL COMPANY

THE NAME TO WATCH IN CHEMICALS

A partial list of other Oronite Chemicals

NOTICE
Some of the following are currently in short supply.

- Detergent Alkane
- Detergent Slurry
- Detergent D-40
- Detergent D-60
- Wetting Agents
- Lubricating Oil Additives
- Cresylic Acids
- Gas Odorants
- Polybutenes
- Sodium Sulfonates
- Purified Sulfonate
- Naphthenic Acids
- Phthalic Anhydride
- Ortho, Meta, Para Xylenes
- Xylol
- Aliphatic Acid
- Hydroformer Catalyst
- Algicide ATM-50

3197

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Four Examples:

1. FOOD AND VEGETABLE PROCESSING

A tremendous aid in washing, peeling and processing fruits and vegetables before canning or freezing. Improves their marketability and aids in the removal of dirt, insecticide and fertilizer residue.

2. CEMENT AND PLASTER INDUSTRIES

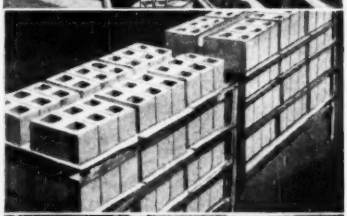
In the cement and plaster industries these surface active detergents are used to improve workability and plasticity, reduce abrasive wear on mixing equipment, facilitate "stripping" from molds or forms, improve texture and reduce water requirements—all of which contribute to lower costs.

3. CLEANING AND WASHING COMPOUNDS

Oronite supplies tremendous quantities of synthetic detergent materials to processors and compounders of packaged cleaners for all household and industrial uses.

4. TRANSPORTATION EQUIPMENT WASHING

Because of its fast action, quick rinsability and high detergency, Oronite D-40, either alone or in compounds, cuts cleaning and maintenance costs on trucks, trains, busses, passenger cars and other types of rolling stock.



ORONITE CHEMICAL COMPANY

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30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y. — 600 S. MICHIGAN AVENUE, CHICAGO 5, ILL.
824 WHITNEY BLDG., NEW ORLEANS 12, LA.

Gentle Killer Arrives

Spandy, a new germicide just successfully test marketed in Wilmington, Del., is moving into the Philadelphia market, with New York next on the list.

Manufacturer G. N. Coughlan Co. is shooting for East Coast distribution now, will follow that with national distribution in both consumer and industrial fields.

A novel formulation containing dodecylamine lactate (0.4%), alcohol (4.2%) and dodecylamine salicylate (0.4%) it is being sold as disinfectant, fungicide and deodorant; is claimed to be effective in soap solutions.

A germicide is a new type of product for the West Orange, N. J., company (others include Chimney Sweep soot remover, De Moist desiccant and Pantastic silicone anti-sticking treatment for pots and pans). But trying something new is old stuff to dynamic Gerald Coughlan, who swung his kitchen hardware manufacturing business into a chemical line at the beginning of World War II. Deciding to stay in chemical specialties after the war, he was given a look at a new fungicide; he liked its possibilities and bought it (U.S.P. 2,471,339). This product, modified by four years in the Coughlan pilot plant, is the Spandy that went into consumer production last November.

G. N. COUGHLAN: The new is old stuff.

Taking on all comers: From the claims for Spandy, it is obvious that it will compete with all disinfectants, antiseptics, deodorants and even mildew-proofers on the market. Like most household disinfectants, it is recommended for such things as sickroom use, laundry and diaper rinsing, and athlete's foot with the mildew-proofing effect an added feature. It can be used wherever water is used in disinfecting and is claimed not to be altered in effectiveness by soap. In addition to home use, it is well suited for hospitals, institutions, restaurants, dairies and food processing plants.

Since the product is being sold in interstate commerce, its label has had to pass the scrutiny of both the Food and Drug Administration and Department of Agriculture (jurisdiction over fungicides). Dodecylamine is well recognized as a germicide and has been sold in the industrial field for this use, but some of Spandy's rivals question the efficacy of the amine salt formulation in soapy water, pointing out that, like a quaternary, it should not stand up in an alkaline medium. Coughlan, armed with its own experimental data in addition to its approved label, counters that its product doesn't fit into established categories, and that dodecylamine lactate and dodecylamine salicylate do remain effective on the alkaline side.

Customers liked it: Coughlan is quite proud of the fact that Spandy contains no chlorine, ammonia or phenolics, and features lack of "hospital smell," toxicity and irritating effect on the skin in advertising and label statements. Newspaper teaser copy preceding its Wilmington introduction announced, "Spandy, the gentle killer, is coming." Apparently residents of that city welcomed it, for it has outsold competitive products thus far, has received no brick bats and many suggested new uses. Much of this success undoubtedly is due to heavy introductory advertising support via newspaper, radio and car and bus cards, and competitors (as well as Coughlan) will be watching repeat sales figures when product promotion is scheduled on a more normal scale.

National distribution will depend upon customer reception as markets are added. Extension beyond the East Coast, the first target area, may be slowed by shipping problems common to such products containing large quantities of water (in this case, 95%). Grocery stores will be the major outlets for the 39¢ bottle (8 oz.). Not only do they sell more of such products than drug or other stores, but because of their rapid turnover, they don't require as high a mark-up. Coughlan knows how to get distribution too, for it now has Spandy in more than 425 Wilmington food markets (67%) and 29 drug stores.

The container is a shoulder bottle, stock mold by Libby-Owens, but Coughlan's supplier has agreed not to push this little-used style. Its wrap-around label has a neat feature that enables the housewife to see how much is in the bottle: the label ends don't quite meet on one corner, and the exposed glass acts as a gage. Containers for the industrial field, where the product has been sold in a small way as the company gathered data on its performance, are gallon jugs and 50-gallon drums. Although emphasis is on exploitation of the consumer market, success there will probably be followed by stepped-up promotion industry.

Lots of Grit

Major soap companies are bringing their established razzle-dazzle selling to the household scouring powder field as they shoot for its $50 million-market. Makers of long-time favorites are perfuming and coloring products, adding detergents to formulas and revamping packages to hold their own with a suds-conscious public.

Almost as much a part of the domestic scene as the coffee pot, the gaudy can of cleansing powder is the American housewife's favorite adjunct to elbow grease, but it does not have complete control of the cleanser market. Steel wool-soap preparations, cake cleansers and ammonia—suitable for many cleaning chores but limited by their specialized uses—yearly claim a share of the wealth. World War II, with its priorities on steel and ammonia, undoubtedly played a part in furthering the cause of abrasive cleaners.

Despite this healthy demand, only

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Sulphate, Benzoate and other derivatives
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Copies of the reports below are available at 50c each. Check titles desired and send this ad with your remittance.

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SCOURING POWDERS: Hucksters lend a hand.

Lever Brothers of soapdom's "big three" is an old timer in this field, and its Gold Dust is not one of the top-selling brands today. Procter & Gamble still has no such product, and Colgate did not get into the running with its Ajax until late 1946. However, Colgate's foaming cleanser, that promises to float the dirt right down the drain, rapidly made up for lost time. Its soap-style promotion shattered the complacency of established names, forced changes in formulation and marketing, and pushed it into the No. 2 spot in the national sales picture. Today it is in the exclusive company of Bab-O, Old Dutch and Swift's* cleanser.

Suds and Smell: Public association of cleansing power with sudsing ability has been no small factor in Ajax' success. Ajax contains the same base detergent—an alkyl aryl sulfonate—as Colgate's high-powered, sudsy detergent, Vel, which makes it worthy of the foaming-cleanser label. This feature has been the keystone of the adman's pitch to the suds-conscious housewife.

It is not the only scouring agent with a synthetic detergent, for most products boast now such a formulation. (Of six popular brands found on Eastern store shelves, five contain a synthetic detergent.) In addition to beguiling the housewife with suds, the synthetic performs the very practical function of cutting grease. Other components show little variation from brand to brand. They are about 90% abrasive (volcanic ash, feldspar, or silica) with the rest soap—if a synthetic is not used—and small amounts of soda ash. Soap, however, has fallen into disfavor because of its limitations in hard water and the availability of synthetic at competitive prices.

Other approaches to making a more salable product have concentrated on sight, smell and touch. These include innovations like perfuming, coloring and prudent container design. (Round containers sell better than square ones; red and green, better than blue.) Protection from the dread scourge of "dishpan hands," guaranteed by some products, is another sales weapon of no mean value.

Not Only Hucksterism: Although advertising salvos of this nature raise some doubt in the minds of cynics, no inferior product can stay on top by dint of advertising alone. Floating the dirt down the drain is no joke, for a major objection to early products composed primarily of abrasives was the amount of rinsing necessary to remove the insolubles after scouring. Soap was added to combat this objection and to reduce the amount of rubbing necessary for grease removal. Synthetic detergents are just an improvement on soap for this job.

On the other hand, even a superior product cannot make much headway on a national scale without the help of the huckster. A quick look at comparative sales statistics will readily reveal the advertising "heavies." But even these are sometimes confounded by regional buying habits not easily changed by conventional promotional techniques. One example of this, a brand known as Kitchen Klenzer, has puzzled the experts by its thirty-year strength in the Chicago-Milwaukee market. Not until 1950 was it dislodged from first place in the Milwaukee area when, according to The Milwaukee Journal Consumer Analysis, it was second choice with 17.6% of the market in contrast to Ajax' 31.9%.

* Introduced in 1947.

Chain Lightning

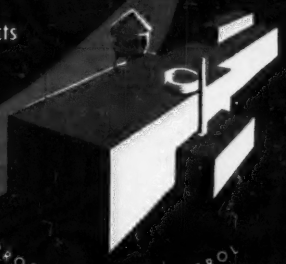
A small specialties outfit's solution to its marketing problem is to concentrate on food chains. With over 70% of New York area food chains handling its floor polish, Arny Chemical Co. has moved into a new plant, is eyeing new products and national markets.

When owners Edward Ani and Salim Shiry moved into their firm's new home at Maspeth, L. I., last week, they had added another chapter to the immigrant success saga of America. In it is a record that most specialties enterprisers can read with profit, for it tells how this company escaped foundering on the rocks of

Foote Lithium . . . 1951

a reaction

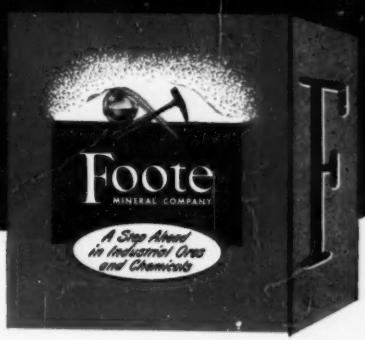
The record performance of Foote Lithium in many industries → large scale demand of top quality products



an equation

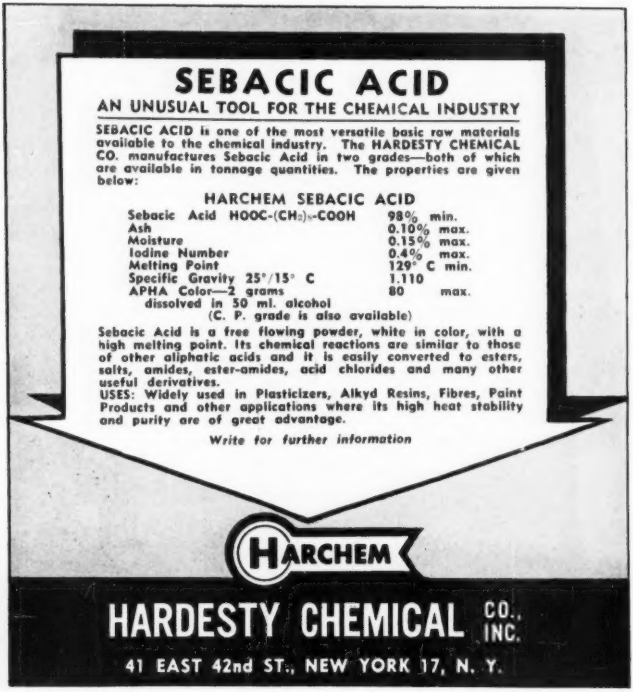
Day to day contact with problems of industry
+ a full scale program of basic research
+ new and improved processing techniques
+ significant contributions to technical literature
+ properties which assure high quality low cost end products
= a solid future for your use of Foote lithium compounds based on
1. abundant ore deposits
2. expanding ore processing facilities
3. sound economics

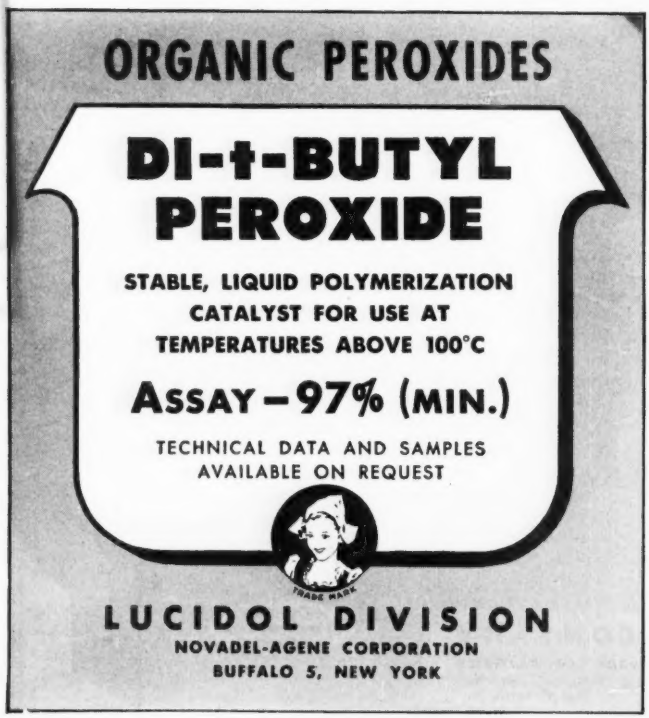
PROJECT YOUR PLANS WITH FOOTE LITHIUM



FOOTE MINERAL COMPANY

HOME OFFICE AND RESEARCH LABORATORIES
401 Eighteen W. Chelten Building, Philadelphia 44, Pa.
PLANT: Exton, Pa.


SEBACIC ACID
AN UNUSUAL TOOL FOR THE CHEMICAL INDUSTRY
SEBACIC ACID is one of the most versatile basic raw materials available to the chemical industry. The HARDESTY CHEMICAL CO. manufactures Sebacic Acid in two grades—both of which are available in tonnage quantities. The properties are given below:
HARCHEM SEBACIC ACID
Sebacic Acid HOOC-(CH2)8-COOH 98% min.
Ash 0.10% max.
Moisture 0.15% max.
Iodine Number 0.4% max.
Melting Point 129° C min.
Specific Gravity 25°/15° C 1.110
APHA Color—2 grams dissolved in 50 ml. alcohol 80 max.
(C. P. grade is also available)
Sebacic Acid is a free flowing powder, white in color, with a high melting point. Its chemical reactions are similar to those of other aliphatic acids and it is easily converted to esters, salts, amides, ester-amides, acid chlorides and many other useful derivatives.
USES: Widely used in Plasticizers, Alkyd Resins, Fibres, Paint Products and other applications where its high heat stability and purity are of great advantage.
Write for further information
HARCHEM
HARDESTY CHEMICAL CO., INC.
41 EAST 42nd ST., NEW YORK 17, N. Y.



poor distribution that are often fatal to small ventures of promise.

Three years ago, the two men came to this country from the Middle East and bought out a chemical company producing a floor polish and an industrial detergent. Renaming the company Arny (phonetic spelling of Ani), the floor polish Prot-o-cel, and the detergent Scan, the partners began their assault on the industrial field. They made little dent in this market, so they tried repackaging Prot-o-cel for retail distribution, placing it in a few department and food stores. Actually they had made a move in the right direction, but it failed to put the operation in the black.

Then, about a year ago, they hit upon a solution to their selling woes: concentrate on the food chains. With an ex-Standard Brands man, Albert Lamilin, as sales manager, they began finding shelf space for Prot-o-cel in key independent chain stores. Distribution was gradually broadened, and under strong advertising support—via car cards, newspapers and television—sales boomed. Sales volume is now at least tenfold that of last year, and at last count, Prot-o-cel was being sold in over 70% of the food chain stores in the New York area.

The product that has been Arny's wedge into the retail floor polish field is the plastic-base type. Like most specialties makers, the company shies at mentioning its specific formulation other than to say it is a perfumed naphtha solution of a synthetic resin. Selling for 79 cents a quart, it is claimed to outlast and outshine wax. A companion product, Prot-o-cel Wax and Plastic Remover—a mixture of solvents—was introduced late last summer at 85 cents a quart can.

The new Long Island plant replaces a manufacturing unit in Newark, N. J., a packaging plant and offices in separate New York City locations, and warehouses in assorted places. In the immediate future the company will be working to achieve complete distribution of the two floor products in an area within 500 miles of New York. Other allied household products—furniture polish is one—are under consideration. (Scan, still an industrial item, is not being pushed; Arny isn't eager to take on the highly competitive detergent field in addition to floor polish manufacturers at this point.) Arny is waiting until it completes its campaign in home territory before shooting for national markets. And when it does, housewives all the way to California can expect to see the Prot-o-cel label popping up on chain food store shelves.

In times like these
It's Easy to Forget Fundamentals

Demand for Caustic Soda is what the needs of a thousand-odd users can create. Supply is what a relatively few plants can possibly produce. One can mushroom overnight, the other can grow only slowly.

In times like these, it's very human to focus upon unfilled needs, to forget how far performance exceeded expectations.

Through all the recent critical months, our plant has produced beyond its "rated capacity". Not every customer has gotten all that he hoped for, much less all that he could use. But equipment has stayed "on the line" longer than conservative maintenance dictated. Cell units have been replaced in "nothing flat". Cars have been spotted, loaded and shipped faster and oftener than 'old timers' ever believed possible. Net, we think our folks have done a darn fine production and distribution job.

True, there still is a Caustic Soda "shortage". But "shortage" is a relative, ever-changing word. As new capacity comes in; as all plants produce 100%; as a higher wisdom specifies essentiality of use, things should get better.

Better, that is, if we all concentrate on the size of the doughnut instead of the hole!

Westvaco
CHEMICALS
WESTVACO CHEMICAL DIVISION
GENERAL OFFICES • 405 LEXINGTON AVENUE, NEW YORK 17
CHICAGO, ILL. • CLEVELAND, OHIO • CINCINNATI, OHIO
ST. LOUIS, MO. • LOS ANGELES, CALIF. • NEWARK, CALIF.

for men concerned with COLOR...

How WILLIAMS saves manufacturer 62.4% and 56.4% ON COLOR COSTS

A large rubber company, manufacturing an olive drab colored stock, consulted us about the possibility of simplifying the pigment composition—and reducing the color cost.

The rubber company's original formula called for a blend of 5 separate colors—one of them organic. Working from this formula, C. K. Williams & Co. developed two blends of less expensive inorganic pigments. These two blends consisted of 4 colors—and were basically stable, permanent iron oxides.

The recommended pigmentations were checked in the Williams laboratory for perfect color matching—and also for such physical characteristics as tensile strength, tear resistance, and oxygen bomb aging.

Both proved to be satisfactory in all respects—and their costs were 62.4% and 56.4% below that of the combination previously used.

LET WILLIAMS PUT THE MICROSCOPE ON *Your* COLOR PROBLEM

Whatever your color problem, bring it to Williams. As shown by this case history—and many similar histories in our files—Williams can often save you time and money on proper color formulation.

For complete technical reports, address Department 20, C. K. Williams & Co., Easton, Pa.

IRON OXIDES • CHROMIUM OXIDES • EXTENDER PIGMENTS

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COLORS & PIGMENTS
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EASTON, PA. • EAST ST. LOUIS, ILL. • EMERYVILLE, CAL.

108 shades and types of iron oxide pigments

SPECIALTIES. . . . .

Aerosol Action

New product: An insecticide, Knox Out, packaged in a 12-oz. container containing DDT, pyrethrum and piperonyl butoxide, marks Pennsylvania Salt Manufacturing Co.'s entry into aerosols.

New packer: Powr-Pak, Inc., Bridgeport, Conn., has been organized by Ed Helfer, ex-Connecticut Chemical Research and ex-Fluid Chemical. Products offered: insecticide, moth proofer, plastic spray, room deodorant, sun tan lotion, wax, paint.

New lab: Givaudan-Delawanna, Inc. has established a special laboratory devoted exclusively to formulation and testing of aerosols. The company has a bulletin describing its services.

Minimum wage: The Secretary of Labor has determined the prevailing wage in the chemical specialties industry at 85¢ an hour. All government contracts from Jan. 23 on must be based on this rate. The order includes companies manufacturing or supplying cleaning and polishing preparations, insecticides and fungicides and miscellaneous chemical and related products.

Paint specs: In a new federal specification issued by the General Services Administration, the number of paint colors the government uses has been reduced from 500 to 187. These colors will be available in book form from the Government Printing Office next month at $4.50 a copy. Title: "Federal Specification, Colors (for) Ready-Mixed Paints."

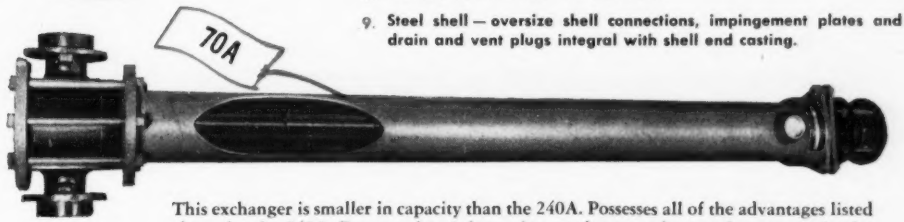
Germicidal soaps: Sindar Corp. will license companies wishing to produce germicidal soaps containing hexachlorophene (G-11 Sindar's trade name for this) under its U. S. Patent 2,535,077.

Polythene ink: Printing on sheets or molded articles of polythene is possible with a new ink developed by Imperial Chemical Industries of Australia and New Zealand Ltd. It consists of a 2:1 mixture of Alkathene 20,000 (a polythene) and polyisobutylene (MW 60,000) as film-forming medium. This is dissolved in a 1:1 mixture of tetrahydronaphthalene and trichlorethylene, and suitable pigments are added. The ink is suitable for rotogravure and screen printing, can also be used as a surface lacquer.

Here's the dope on 2 "KARBATE" IMPERVIOUS GRAPHITE HEAT EXCHANGERS

The new No. 240A is a shell-and-tube heat-exchanger made of "Karbate" brand impervious graphite . . . similar in construction to the familiar No. 70A . . . but with almost three times as much total effective external heat transfer surface. Advantages are:

1. **70.6 sq. ft. of external heat transfer surface.**
2. **Single, double or four-pass routing of tube-side fluid is effected by a simple change of fixed and floating end-cover assemblies.**
3. **Wide variety of corrosive fluids handled with negligible maintenance.**
4. **Thermal shock resistance.**
5. **Very high heat transfer rates.**
6. **Stainless steel baffles.**
7. **Easy tube replacement in the field.**
8. **Removable "Karbate" tube bundle.**
9. **Steel shell — oversize shell connections, impingement plates and drain and vent plugs integral with shell end casting.**



This exchanger is smaller in capacity than the 240A. Possesses all of the advantages listed above for the 240A. For complete information on these two heat exchangers, write for catalog sections S-6715 and S-6690. Address National Carbon Division, Dept. CI.

A LITTLE PICK-ME-UP OF H_2SO_4 MAY HELP THAT INDIGESTION I'VE BEEN GETTING FROM 'KARBATE' IMPERVIOUS GRAPHITE

The terms "Karbate" and "Eveready" are registered trade-marks of

NATIONAL CARBON DIVISION
UNION CARBIDE AND CARBON CORPORATION
30 East 42nd Street, New York 17, N. Y.
District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: National Carbon, Ltd., Toronto 4

SLASH BATTERY COSTS IN HALF

With the revolutionary new "Eveready" No. 1050 Flashlight Battery you get these big exclusive features:

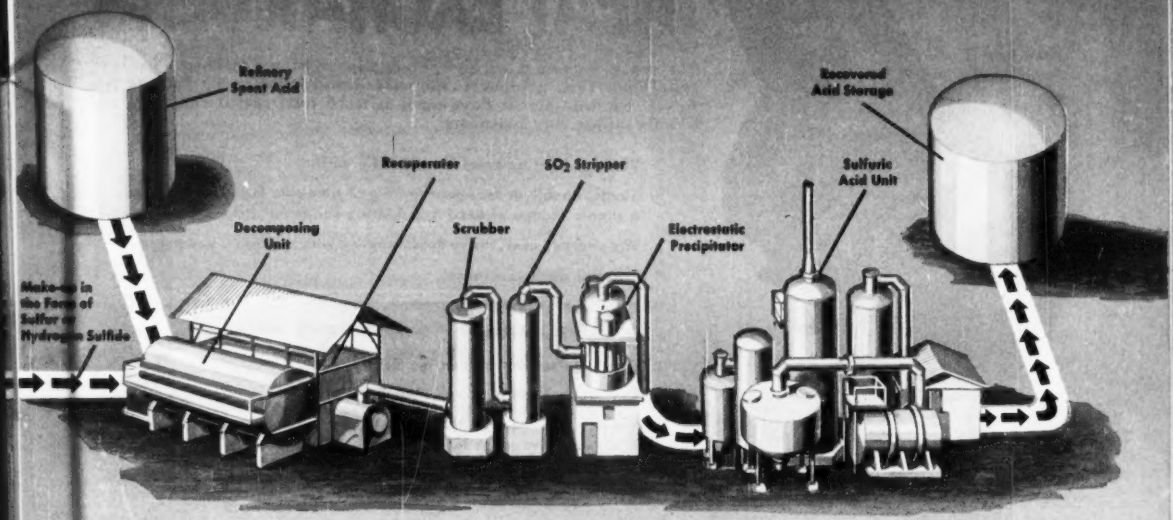
- More than twice as much light.
- Whitest, brightest light available from a flashlight battery.
- Half the cost for light output.
- Leakproof—no metal can to leak or corrode.
- Will not swell, stick or jam in a flashlight.

Why? Because of the *exclusive* "inside-out" construction of the "Eveready" No. 1050 battery. Instead of being the container for the cell, the zinc electrode is on the inside to make the battery last longer, while the new outside carbon jacket makes the battery leakproof. Order a supply of No. 1050's *today*.

HEAT EXCHANGERS • PUMPS • VALVES • PIPING • TOWERS • TOWER PACKING • BUBBLE CAPS • BRICK • STRUCTURAL CARBON • SULPHURIC ACID CUTTERS • HYDROCHLORIC ACID ABSORBERS

CHEMICO OFFERS AN ECONOMICAL PROCESS FOR

Spent Alkylation Acid Regeneration



*D*ue to the increased cost of brimstone and the vital need to conserve basic sulfur deposits, petroleum refiners producing high octane aviation gasoline will find it desirable to recover the sulfuric acid from their spent alkylation acid. For this purpose, Chemico offers a proven and economical process.

In this process, spent alkylation acid—now in greater supply as a result of the increased manufacture of high octane gasoline—is sprayed into a furnace maintained at a high heat with auxiliary burners. Sulfur or hydrogen sulfide may be used as fuel thereby producing SO_2 gas for the production of make-up acid.

A limited amount of other liquid acid sludges, high in hydrocarbon content, may also be added to the alkylation spent acid, thus providing fuel as well as additional acid production. The hydrocarbons are completely consumed and the acid is broken down into its components—sulfur dioxide, oxygen and water. After the water is removed, the gas is processed to fresh acid of 98% strength in a Chemico contact sulfuric acid unit. Send for additional information, stating your requirements.

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A UNIT OF AMERICAN CYANAMID COMPANY

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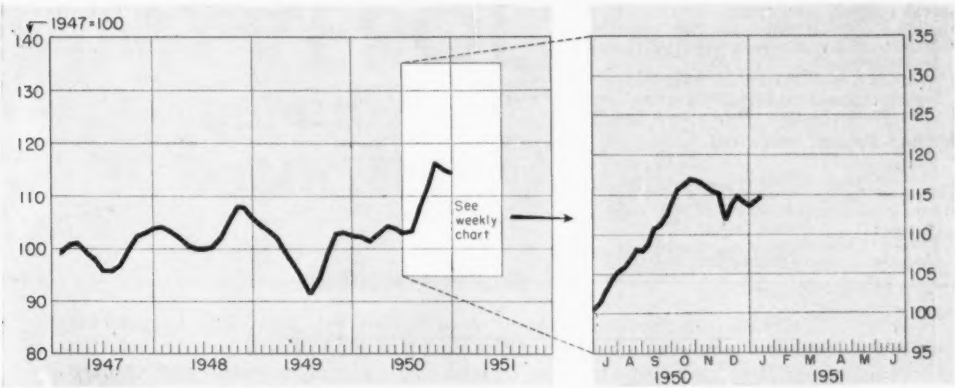
CABLES: CHEMICONST, NEW YORK

Chemico plants are profitable investments

CC 211

CHEMICAL MARKETS...



CHEMICAL INDUSTRIES OUTPUT INDEX—Basis: Total Man-Hours Worked in Selected Chemical Industries

Price controls are definitely coming but will be delayed. Policy differences within the ESA and few teeth for enforcement at this time are factors contributing to the postponement.

One early hot potato for the control program: permitting costs to rise unchecked on imports, including many chemicals, while trying to maintain or roll back domestic prices.

Additional sources of strategically essential imports are needed because of the precarious situation in the Far East. Complete disruption of supplies from this area would leave the U. S. in a highly dependent position for tin, tungsten, and crude drugs. Replacements from South America and Africa will be speeded.

Comparison with the 1941 period finds the present government stockpile in better shape for rubber, quinine, vegetable oils and cinchona.

U. S. imports are running higher than exports for the first time in thirty years. This trend will accelerate during 1951 to meet expanded requirements for raw materials and semi-manufactures. Chemical imports are almost entirely in the category of raw materials, but increasing quantities of chemical intermediates from Europe can be anticipated as production demands mount.

Counter to the general upward price trend in plastics and many another commodity, is the recent 8¢ a pound decrease in Rohm & Haas' methyl methacrylate. Made by an improved process, new potential applications at this reduced price are sparking keen interest in the plastics industry.

Natural drying oils are far from plentiful, although recent price increases have improved the supply picture to some extent. Surface coatings feel the shortage most in tung oil, for which China has been the largest supplier until a few months ago. Prospects for domestic production are less favorable than last year's, but larger quantities are now offered from Argentina and Rotterdam.

Better supplies of castor and oiticica oils are now available from Brazil, the major source for the U. S. But paint manufacturers' pocketbooks will show the difference as castor seed prices have risen from $95 to $300 a ton in the last year.

Brightest prospects for supply and relative price stability are linseed and soybean oils, both being produced and consumed at record rates.

Almost every chemical manufacturer faces a shortage of metal containers, especially those requiring tin. One result of the situation: more beer in glass bottles.

Glass output should improve as soda ash production begins to gain on the oversize backlog arising from last summer's shutdown.

MARKET LETTER

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947 Index=100)	115.0p	114.8r	101.7
Bituminous Coal Production (Daily Avg. 1,000 Tons)	2,012	1,880	1,130
Steel Ingot Operations (% of Capacity)	99.1	98.2	89.6
Wholesale Prices—Chemicals and Allied Products (1926 Index=100)	142.2	141.2	116.0
Stock Price Index of 14 Chemical Companies (Standard & Poors)	209.7	210.3	160.9
Chem. Process Industries Consist. Awards (Eng. News-Rec.)	$5,412,000	$6,246,000	$3,416,000

MONTHLY BUSINESS INDICATORS	Manufacturers' Sales			Manufacturers' Inventories		
	Latest	Preceding	Year Ago	Latest	Preceding	Year Ago
All Manufactures (Million $)	21,396	21,229	16,221	32,939	31,784	28,656
Chemicals & Allied Products (Million $)	1,529	1,550	1,167	2,255	2,187	2,074
Paper & Allied Products (Million $)	671	656	502	698	690	669
Petroleum & Coal Products (Million $)	1,907	1,834	1,589	2,172	2,162	2,247
Textile Mill Products (Million $)	1,355	1,293	1,033	2,731	2,616	1,953
Leather and Products (Million $)	268	324	244	619	596	517

Supplies of insecticides should be adequate this year. U.S. Department of Agriculture officials do not foresee a need for allocations if hoarding can be minimized. Substitution of arsenates of lead and calcium in cotton and orchard pest control would extend the quantity of insecticides based on critically short benzene and chlorine.

Conservation of metals is a prime objective in the vast mobilization program. Non-defense applications of tin, cobalt, tungsten, and nickel have been drastically curtailed, and limitations on copper and aluminum will become progressively tighter.

Producers of zinc and lead have agreed to hold the price line, although both are in great demand, and supplies are limited, particularly with zinc. Some legislative action has been proposed to repeal the import levy on copper as a means of coping with extensive industry and government requirements.

Financial speculation in the international metals market is making some precious metals more so. Silver rose to a thirty year high of 90.16¢ an ounce, gold registered a second advance in a ten day period to $43 an ounce, and mercury from Spain climbed nearly 40% in one week to $160 a flask.

Butadiene needs for synthetic rubber are closely related to the supply of the well-known political football alcohol. Negotiations have been conducted through the RFC for 113,000 gallons of alcohol from France during the coming year. Some opposition has already been expressed by farm interests who visualize unfavorable grain price reactions.

Sen. Brewster (Maine) last week called attention to the 20,000,000 lbs. of government owned surplus potatoes waiting to be fermented. Synthetic alcohol from petroleum and butadiene also from petroleum are two additional major factors affecting supply outlook.

Critical shortage of sulfuric acid is behind the U.S. Commerce Department action in reducing the sulfur export quota. In spite of production at record levels, increasing demand has resulted in shortages of a host of other chemicals.

SELECTED CHEMICAL MARKET PRICE CHANGES . . . Week Ending Jan. 15, 1951

UP

	Change	New Price		Change	New Price
Ammonium Nitrate, fert. grade/ton	$5.00	76.55	Heliotropin, ctns.	$0.30	3.65
Anise, ctns.	.25	2.50	Menthol, Natural, U.S.P.	.10	14.50
Carnauba Wax Yellow, No. 1	.15	1.45	Mercury (76 lb. flask)	35.00	188.00
Casein	.01	.43	Mercuric Oxide, Yel. Bbls.	.65	3.32
Cassia Oil	.25	5.25	Rosin, Gum, K.M., cwt.	.25	8.75
Citronella, Ceylon	.05	4.35	Sodium Stannate	.06½	.99
Corn Starch, Chicago, C. L.	.02	5.92	Stearic Acid, single Press	.02	.24½
Egg Albumen, edible	.03	1.75	Tallow, fancy	¾¢	.18
Eucalyptus (80-90%)	.10	1.45	Tin	.14	1.75
Eugenol	.35	3.75	Turpentine, gum/gal.	.10¾	.91

DOWN

Glycerine, Soap Lye	.04	.41

Prices per lb. unless quantity is stated.

MYVEROL®

DISTILLED MONOGLYCERIDES

odor-free

catalyst-free

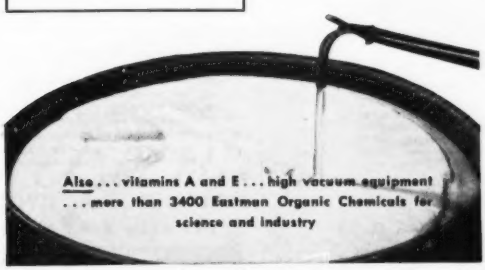
soap-free

THE 90% monoester content of these products, achieved by molecular distillation, can lead to profitable improvements in appearance, texture, and stability of many food and pharmaceutical products.

Available as: *Type 18-85*, a plastic fat made from refined cottonseed oil; *Type 18-40*, a firm fat made from prime steam-rendered lard; *Type 18-05*, a solid glyceryl monostearate made from hydrogenated lard. For estimates on delivery dates in quantities from drums to carloads, and for information on distilled monoglycerides from other fats—write, wire, or phone ***Distillation Products Industries,*** 789 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N. Y. • 135 South LaSalle Street, Chicago 3, Ill. • Gillies & Loughlin, Los Angeles and San Francisco • Charles Albert Smith, Ltd., Montreal and Toronto.

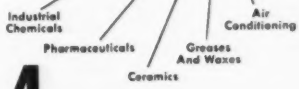
DPi

distillers of monoglycerides from natural fats and oils



METALLOY

. . . is your BEST source of supply for Lithium Salts and Lithium Metal



4 FACTORS make Metalloy your most reliable supplier of Lithium Salts and Metal:

1. Company owned ore deposits and concentration facilities

2. Complete chemical processing and electrometallurgical plant

3. Research facilities

4. Exclusive attention to Lithium—its research, development, production and application—for Industry

Metalloy-Lithium Salts and Lithium Metal Are Available in Either Experimental Quantities or Commercial Tonnages.

LITHIUM METAL—Ingot, wire, shot, rod, cups, ribbon, and copper, sealed rod. Uses: Organic synthesis and metallurgy.

LITHIUM HYDRIDE—Lump, ground. Uses: Drying agent, hydrogen generation, organic reactions.

LITHIUM AMIDE—Lump, powder. Uses: Stable amide for organic reactions.

LITHIUM

- ALUMINATE
- BORATE
- BROMIDE
- CARBONATE
- CHLORIDE
- COBALTITE
- FLUORIDE
- HYDROXIDE
- MANGANITE
- MOLYBDATE
- NITRATE
- SILICATE
- TITANATE
- ZIRCONATE
- ZIRCONIUM SILICATE

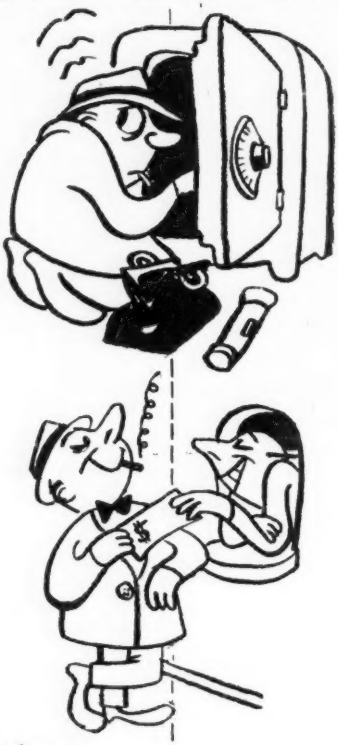
Write today for FREE Data sheets.
No obligation.

IF IT'S LITHIUM — CALL METALLOY

METALLOY CORPORATION

SAND TOWER MINNEAPOLIS, MINN.

WHERE you get it... DOES make a difference



When you place your order with Barrett you're assured prompt, dependable service and top-quality products, backed by 96 years of successful manufacturing experience.

WHEN YOU NEED A COAL-TAR SOLVENT

Benzol
Toluol
Xylol
Hi-Flash Solvent

GET IT FROM Barrett

Reg. U. S. Pat. Off.

Phone your orders for express tank-truck deliveries

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Detroit	Vinewood 2-2500	Philadelphia	Jefferson 3-3000
		St. Louis	Lockhart 6510

Hi-Flash Solvent available at all stations, except Buffalo.

THE BARRETT DIVISION
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Eliminate Corrosive Fumes!

Pyroflex-Constructed FUME WASHERS

Some of the gases scrubbed by these units contain the following:

Bromine
HCl
Sulphur Dioxide
Chlorine
Benzol and HCl
Sulphuric Acid
Sulphuric Acid and Dust
Muriatic Acid and Chlorine

Every Pyroflex-constructed Fume Washer is individually engineered for maximum efficiency. In each case Knight engineers consider individual requirements, limitations, water consumption and fan power, as well as service conditions. The result is an engineered functional unit "tailored" to meet specific requirements. These units utilize Berl Saddles to insure peak performance.

Although individually engineered, Knight Fume Washers are relatively low in cost and economical in operation.

When writing for information, please include full details regarding service conditions.

Advantages

- **No moving parts.**
- **Turbulent gas flow, definite directional changes.**
- **Large useful surface area, no ledges or pockets.**
- **Low pressure drop, low power costs.**
- **Wide operating range.**
- **No temperature limitations.**
- **Simple to operate, low maintenance.**
- **Self cleaning, does not plug easily.**
- **Corrosion resistant throughout.**
- **Wide range of shapes and capacities.**
- **Small floor space, low head room.**
- **Performance guaranteed.**

MAURICE A. KNIGHT
201 Kelly Ave., Akron 9, O.
Acid and Alkali-proof Chemical Equipment

R. SHERIDAN LECTURES: Stauffer management approves.

Foremen Trained to Train

Stauffer Chemical brings in Training Within Industry Foundation to coach foremen in job instruction.

Job analysis stressed by experts as the "big" prelude to job instruction.

Training check-card offers means of evaluating training progress.

Stauffer Chemical Company believes in training its foremen . . . and doing a thorough job of it. This week the management of the company studied the transcripts of the latest of its foremen training sessions and the general opinion was a proud . . . "well done."

This most recent school for Stauffer supervisors was held in New York's Belmont Plaza last month. It had a faculty of one: Richard Sheridan of the Training Within Industry Foundation, often regarded as the country's top supervisory training agency. To Sheridan and TWI the assignment was a familiar one for many of the staff of the Foundation are former members of that arm of the War Manpower Commission which trained over 3 million war plant supervisors during World War II.

TWI enters: Actually this TWI-run session was but one phase of Stauffer's integrated program launched five years ago for the purpose of training supervisory personnel at all levels in the spirit and techniques of constructive supervision. The first meetings were company held and had the basic goal of convincing the foremen that a revamping of old methods of supervision was in order. They also served to sound out opinion about just what type of training would be most useful. Lectures by college faculty members on the principles of the economics and management phases of the chemical industry followed. Then TWI and Sheridan were brought in to furnish the down-to-earth side of supervision training.

As per the suggestion of TWI the attendance at the session was kept to less than a dozen in order to promote free and frank discussion. And all the foremen present were selected from one division of the company. This, company officials explain, was necessary to assure that the job details discussed would carry a personal impact to each of the supervisors.

Sherdian quite frankly builds such sessions about the tried and often forgotten duties of sound leadership: analyze, organize, deputize and supervise. The big difference is that he puts the teeth of case histories, good and bad, into them.

Analyze: He hammers particularly at the need for sound job analysis which in his opinion is the most neglected step in the foreman's responsibility of training new workers. "You can't teach a man unless you first determine what you're going to teach him," was the way TWI's expert summed up this point.

Job analysis has five basic needs, says Sheridan. He lists them as knowledge of work and responsibilities and skill of instruction, leading and planning. If a foreman is well equipped along these lines he is then in a position to set up the training check card that TWI recommends as a means of determining which employees need further job instruction.

Check: This analytical device lists each of the basic elements that comprise a given job. If a worker is proficient in a given operation an "X" is placed in that operation's column

Plant- No. 1
Dept- Production
Oper- Preparation

Employees	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Time with Company	Time on present job	Quality of work	Quantity of work	Job knowledge
Jack F.	X	T	T	X	X	T	X	T	6 2	8 3	6	4	6-
Tom C.	X	X	T	T	X	T	X	X	10 1	9 4	6+	6-	6
Ed R.	T	T	X	X	X	T	T	T	6 5	6 4	4	4	6
Pat F.	X	X	T	T	X	T	X	T	11 3	8 7	4-	4+	6
Bill M.	T	T	T	T	X	T	T	X	6 4	6 3	4	2	6

Code- "X" Does task well-no training needed
"T" Needs improvement-training needed

Ratings- "6" Adequate-meets requirements
Below 6-inadequate

TRAINING CHECK CARD: Analysis comes first.

next to his name. A "T" is used if further training in that step of the total job is needed. A predominantly "T" man, points out Sheridan, is often a menace to the morale and safety of the plant unless his "T's" are turned to "X's" by the benefit of good instruction.

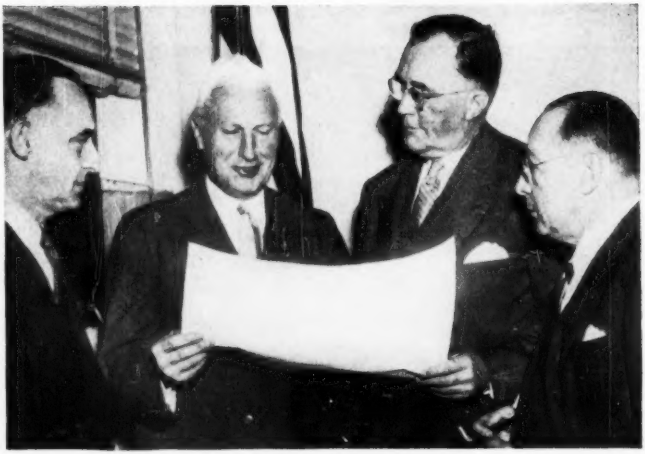
Measure: In another part of the card the man's time with the company and the time on his present job are noted. And finally the quality and quantity of his work and the extent of his job knowledge are evaluated on a scale where a score of 6 is considered adequate and less than 6 deficient.

But the value of the training check card doesn't lie only in its ability to analyze immediate training needs of individual workers. Subsequent check cards compiled after a period of job instruction provide a means of finding out how much of the training "took." And with men like everything else in industry, explains Sheridan and now Stauffer foremen . . . "progress reports are the only way you have of measuring progress."

Dartmouth Lab: But all the concern about job analysis isn't at Stauffer Chemical. The Thayer School of Engineering at Dartmouth College recently set up the Work Simplification Laboratory dedicated to discovering the elements of jobs. Once a job is reduced to its fundamentals, explains William P. Kimball, Dean of the Engineering school, it is possible to revise the steps in a manner that will make the total job more interesting to the worker.

The lab, which will be opened for classes next month, will teach the students to analyze the aims of each project and then devise means and devices to promote these aims. Job steps will be recorded by motion picture cameras and the resulting film shown in slow motion for further analysis. Each analytical group will try to sell its remedies to the class as a whole.

Industrialists this week will introduce their Emergency Training Program for Northern Ohio Industry. The program will serve a double purpose —it will turn out training directors, and will circumvent government interference. They feel that the work can best be accomplished when not part of a government plan. On the latter count, they are in complete accord with TWI. TWI served five years as a government project and five years as a private foundation. The consensus is that it has done a much better job on its own.



TOP LEVEL REORGANIZATION: W. H. Harrison, left center, head of new DPA, checks plans with his boss, Charles E. Wilson, right center, ODM head. Wilson's assistants General Lucius Clay, left and Sidney Weinberg, right, look on.

Wilson Was Right

This week government and industry officials agreed that the prediction made by Charles E. Wilson on January 3 has been borne out. They referred to his statement regarding the appointment of W. H. Harrison to head the then newly created Defense Production Administration. At that time the ODM chief claimed that Harrison's elevation from NPA was a step to streamline the overall production effort and that it was merely a move of internal reorganization that "would not disrupt the channels through which the public and industry have been dealing."

Evidently the trend in the present emergency, unlike World War II, is to build from the top down in order to avoid the chaotic mushrooming of administrative agencies wherever a momentary need may arise. This is good news to chemical manufacturers (among others) who in the last war had to follow the orders of duplicate yet conflicting agencies.

Friction comes: But on the bad news side of the ledger is the old factor of human friction that will arise in any organization regardless of the brilliance of the attempts to avoid it. Observers claim, for instance, that members of the NPA's Chemical Division and those of the regular Commerce Department's Chemical Division do not see eye to eye on many points. The coolness began when the Commerce Department group was taken over bodily and made part of NPA.

Some say the swiftness of the move was what made it possible for the Chemical Division of NPA to set some sort of record for speed in issuing orders and invitations to industry to attend advisory meetings. This aspect of the situation was good. But in the haste of the whole thing department heads were somewhat pressed for time in which to compare notes and ideas. Hence the present chafed feelings.

Old story: Observers who have lived through an emergency or two in the national Capitol aren't alarmed by such situations however. They claim it's the old story of "regulars" resenting being run by new people. Newcomers have the steam and the ideas but the veterans have the savvy and patience necessary to survive in the Washington whirl.

No backtalk: But what rankles the government employee more than anything else, particularly one who has "status" (i.e., is a civil service man, subject to retirement benefits, etc.) is that he cannot complain openly without running the risk of demotion. And this is especially irritating to the "regulars" who feel that NPA, ODM and the like are but passing shows. Veterans feel that they will be on the job long after the emergency agencies' letterheads are destroyed or overprinted.

Last week one division chief when queried about a touchy situation regarding the suspension of a division report said: "Look, I'm a career employee being run by non-career people . . . does that answer your question?" It did.

Management Star

"Excellently managed"—that's the tag hung on 243 companies by the American Institute of Management after a study of over 2000 leading concerns. The chemical industry came in for the lion's share of the awards—out of 191 chemical processing companies studied, 48 made the select circle. Or, in terms of percent, 25% of the chemical companies surveyed were found to be excellently managed. That figure compares with 10.8% for all other industry.

Jackson Martindell, president and founder of AIM, gave chemical management an additional boost in a lecture at Dartmouth last week. Out of ten companies picked as models of excellence for some particular phase of management, five were part of the chemical processing industry. The five: Pennsylvania Salt, du Pont, Standard Oil of New Jersey, Merck, and Procter and Gamble.

Pace helps: Martindell gives two reasons for the superiority of management in the chemical field. First, the leaders have set a fast pace and the rest of the field has had to follow suit in order to compete. Second, the chemical industry attracts what is in general a higher type man than do the other industries. This, he avers, results in better management down-the-line. In the other fields, good management may consist of ten or fifteen men at the top, but chemical companies excel at all levels of management.

AIM was organized in July 1948 as a non-profit organization. The management audit was introduced in an effort to set up a scientific yardstick for measuring management. The undertaking is admittedly an ambitious one, attempting as it does to set up universal criteria for management in diversified fields, each with unique problems.

Martindell's approach to the problem was unusual. He selected a few companies which were generally conceded to be well managed. By analyzing the companies and their competitors, he was able to decide whether the general high regard was actually merited and to eventually arrive at a standard for comparison.

Ten basic factors: Having achieved a standard, he then broke all corporate activity down into ten basic factors—his "common denominators of management." To each factor he assigned a weight depending on what his experience indicated that factor plays in good management.

In practice the audit works like this:

J. MARTINDELL: Ten common denominators for management.

list of 301 questions is submitted to a company, each question relating to one of the ten factors. Some of the questions can not be answered objectively by the officials of the company, and in these cases AIM relies on information from junior executives, workers, and competitors. A three man audit team evaluates the answers independently and an average value for each of the ten factors is determined. The majority of the companies fall into the 6000 to 7500 point class and it is these companies AIM hopes to improve by holding up models of excellence.

MANAGEMENT EVALUATION TABLE

	Maximum Attainable Rating
Economic Function	400
Corporate Structure	500
Health of Earnings Growth	600
Fairness to Stockholders	700
Research and Development	700
Directorate Aanalysis	900
Fiscal Policies	1100
Production efficiency	1300
Sales Vigor	1400
Executive Evaluation	2400
Total (Theoretical Perfection)	10,000
Minimum requirement for "Excellent" rating—7,500 points	

Chemical tops: An interesting point in connection with the rating for chemical companies: they fared well in the audit in spite of the fact that only 7% of the total points were for research and development which are widely agreed to be the bread and butter of a chemical concern.

The audit used SEC classification of industry exclusively. The term chemical processing industry was used to include basic chemical companies, as well as companies listed in the following fields: soap and toilet preparations, oil refining and distribution, paper and allied products, drugs and medicines, paints and varnishes.

Murky Water

How far do the rights of a chemical company extend in its efforts to protect the purity of the source of its process water? This question will be answered when decision is handed down in the $30,000 suit recently filed by Procter and Gamble in Federal Court at Norfolk, Va., against two dredging companies whose operations in the Elizabeth River, P and G claims, polluted the water source for the company's shortening plant at Portsmouth, Va.

The companies being sued are the Norfolk Dredging Company Inc., and the American Dredging Company Inc., who, late in 1949 or early in 1950 according to P and G, stirred up the waters of the river to a degree that muddied the adjoining Paradise Creek from which the vegetable oil refining plant draws its process water. Because of the resultant silt, P and G claims it had to shut down operations temporarily . . . . hence the yelp for damages.

Plans awry: Actually, if things had gone as planned, everyone would be happy. The dredging firms who were working on a government contract took the precaution of depositing the earth, sand and other debris from the dredging work in a spot called McClean's Lake which borders on Paradise Creek. And to keep the stuff out of the creek they constructed an earthen bulkhead or levee between the lake and the creek.

But the levee didn't do its job, argues P and G, because it was "improperly constructed." It gave way on two separate occasions, the complaint charges, and caused the manufacturing plant to close down twice because of unfit water.

In addition to alleging that the defendants created a public and a private nuisance the suit requests that a mandatory injunction be issued requiring the defendants to restore the creek to its natural depth and condition or, in lieu thereof, that judgment be rendered for the cost of its restoration.

On top of this P and G also requested a temporary injunction to restrain the American Dredging Company from removing its dredge from the Eastern District until the creek is restored.

Big shots are meeting in Ohio this week to hear progress reports on the organization for research on industrial waste disposal. Occasion is meeting of National Task Committee on Industrial Waste. Meeting was scheduled earlier but was postponed.

WICK (management) and CAPOLI (labor) shake hands on birthday bonus.

Birthday Bonus

Birthdays and labor contracts are normally unrelated subjects . . . . but not in the minds of the management of Plastic Manufacturers Inc. of Stamford, Connecticut and Local 226 of the United Gas, Coke and Chemical Workers of America, CIO. These two groups recently signed a labor contract in which a worker receives double pay if he works on his birthday. Management, union and observers believe the contract has established a new field of negotiation in labor-management bargaining.

The union first entered the Plastic Manufacturers' establishment in late 1944 after the company had been banging out precision moldings for industry for seven years. A union shop covering all production and service employees was organized in 1949 but the contract at that time contained nothing unusual. A liberal number of paid holidays plus pay and fringe benefits was then sufficient to satisfy the union.

Impasse: But when the contract came up for renewal last fall the union sat down at the bargaining table with a pocketful of pretty hefty requests. The total demand in fact came to a 24¢ per hour increase leaving no doubt in management's mind that a compromise was desperately needed. Without one, labor trouble seemed imminent.

The company was mainly concerned with the problem of how to divide the package until Warren Gill, the plant manager came up with the idea that solved the tangle. Gill suggested that rather than meet the union's full demands for longer paid vacations, a settlement might be reached by granting double pay to an employee if he worked on his birthday.

Myron A. Wick, Jr., president of the company, balked at the unprecedented plan at first. But he changed his mind when a study of the birthday list demonstrated its workability. It showed that $\frac{2}{7}$th of the employees' birthdays would fall on weekends, $\frac{1}{7}$ on holidays and vacations and $\frac{4}{7}$ths on regularly scheduled production days.

The company believed that most of the workers would work on their birthdays in order to receive the additional pay. This, proponents of the plan argued, would mean less interruption of the 175 man production schedule and improve relations between supervision and individual workers.

Solution: The mechanics of the plan are quite simple. In the event of a worker's birthday, the foreman presents the birthday check to the employee on behalf of the company. Actually, though an employee receives extra pay only if he works on his birthday, it may amount to even more than double the base due to the company's incentive plan.

If, for instance, the employee has a base job rate of $1.25 an hour and works hard and produces more than usual, the incentive plan entitles him to $1.35 per hour as his working wage. The total birthday pay is then figured at $1.35 an hour for the 8 hours he is actually on the job plus $1.25 an hour, the base rate, for his birthday bonus. The company by making this arrangement felt that it was giving the equivalent of an extra holiday without interrupting the plant schedule.

Still more. In conjunction with this plan the company gives individual employees at the end of every year $10.00 for each anniversary of service with the company. This check is presented annually to an employee by his foreman with the congratulations and best wishes of the company.

With all these things to recommend it the contract providing for birthday and anniversary benefits plus a 10¢ an hour general increase was signed 4 weeks prior to the expiration of the old contract. The total gain for the union was equivalent to an 11¢ package agreement which at the time of bargaining was right in line with what other industries were doing. The difference lies in the novel way the important eleventh cent is granted via the birthday route.

Morale boost: The management of the company claims that the novel contract has sparked a new high in spirit and teamwork among the workers. At last report every employee had decided to work on his birthday, thus guaranteeing an uninterrupted production schedule.

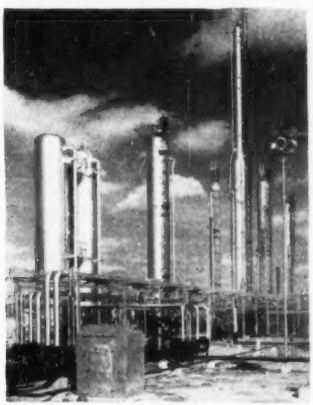
The union is satisfied too, according to Sam A. Capoli, president of the local and chief negotiator for the labor side. Capoli is in the fortunate position of having been able to get something different for his membership. "Look what we got" is his proud boast to other locals in the international union.

Another view: Unions may be here to stay but you can't prove it by the production workers in the ammonia plant of the San Jacinto Chemical Corp., at Houston, Texas. They voiced an emphatic "no thanks" at a recent election conducted by the National Labor Relations Board to determine whether employees would like to be represented by a union. The actual

count was 3 to 1 in favor of individual bargaining.

Union sued: Another group which seems to have a substantially dim view of unions is also located in Houston. More than a hundred former workers for Mathieson Chemical Corp. are suing their own union, the Oil Workers International Union, CIO, for $877,000. Their claim is that the union leaders mishandled a 1949 strike. The suit is getting nowhere in a hurry. It came up before a federal judge, T. M. Kennerly. Attorney for the union contended that the case didn't come under federal jurisdiction and that the Taft-Hartley act, therefore, did not apply. Attorney for the plaintiff said that the case was well under the scope of the T-H act. Judge Kennerly decided to take more time to evaluate the merits of each side but gave no indication as to when he would render an opinion.

EXPANSION



GASOLINE: New plant in full swing.

Shell Oil: New gasoline plant at Provident City, Texas, started operating at full capacity last week. Construction had been completed for 6 months but plant was operating at 20% capacity awaiting completion of pipe line.

Rated capacity is 60,000,000 cubic feet of gas a day. 50,000,000 cubic feet of dehydrated residue gas will be sold to Texas Eastern, and, 2500 barrels of liquid products will be recovered.

Plant includes a laboratory, office building, shops, warehouse, and 12 house camp for key personnel.

Stauffer Chemical: Installation of additional equipment at its Niagara Falls chlorine plant will make stated goal of 50% increase in production a reality by March or April of this year.

Stauffer says that tight chlorine market plus its own increased use of chlorinated products made the expansion necessary.

Barrett Division: Expanded markets for phthalic anhydride has caused Barrett to expand facilities at Chicago plant at a cost of $4,500,000 to include production of that chemical.

Present Barrett phthalic anhydride plants are located in Philadelphia, and Ironton, Ohio. Production will be in full swing by end of 1951.

Big Merger of Minnesota Mining and Manufacturing with the **Carborundum Corporation** did not materialize. The companies had received the green light from the Justice Department, and the deal was expected to be consummated this month. In a joint statement, however, Chairman McKnight of 3M and President Clark of Carborundum said that plans for merging were dropped because of passage of the Kefauver Anti-Merger bill.

Legislation was long overdue—Presidents Hoover, Roosevelt, and Truman had advocated it. Actually, it was an amendment to the Clayton Anti-Trust Act passed in the Wilson Administration. Section 7 of the Clayton Act prohibited purchase of stocks of one company by another where the result would be monopolistic. Shrewd corporation lawyers soon found a loophole, though, by purchasing company assets instead of stocks. The action was declared legal by the Supreme Court.

A spokesman for Carborundum, when questioned about the merger said the company had a long range plan with two objectives in mind: to modernize facilities and to seek product diversification. He said the merger had looked like a quick method of achieving the second objective. Carborundum will go ahead with its own plans for product diversification, as well as plans to modernize and expand facilities.

All hope for eventual merger has not been abandoned. At last report, counsel for 3M was still studying the law. If further investigation shows that a government suit can be successfully withstood, the merger may yet become an actuality. Prospects are slim and it's a safe bet that the merger is permanently shelved.

World Sulfur Situation: First country to feel pinch of U.S. cutback on sulfur exports is Great Britain. The Board of Trade, in an order effective this month, said that henceforth all supplies of sulfuric acid and sulfur will be rationed.

FOREIGN

SULFUR: more rationing for British.

In the cutback, the Commerce Department reduced export quota to 200 long tons of crude sulfur and 7,500 long tons of refined sulfur of the first three months of 1951.

Howls went up from the State Department as well as Organization of European Economic Cooperation, but the Commerce Department turned deaf ears; had no choice but to place domestic welfare above that of foreign nations. Furthermore, Commerce Department said, it had no guarantee that exported sulfur would not be reexported to our prospective enemies.

British Board of Trade pointed out that production of sulfuric acid from other raw materials would not be affected but that in the interests of national economy all sulfuric acid must be rationed.

A possible ray of hope in the sulfuric picture is Italy. Late last year it asked for reduction of the price—now double U.S.—on its sulfur placed at the disposal of OEEC countries. Against advice of its own chemical industry, Italy has set up a tentative 5 year plan scheduled to place at export disposal 450,000 tons of sulfur in 1955. Schedule for 1951 calls for approximately 200,000 tons.

The British have something to shout about, though. Estimates of mineral deposits containing potash state that Britian has enough to meet requirements for 140 years, even if annual consumption rises to 50,000 tons. Deposits are located in North-East Yorkshire.

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PEOPLE

Mark M. Biddison is the new executive vice president for General Chemical Division, Allied Chemical and Dye.

Biddison began his career in General's sales department 33 years ago and eventually became manager of sales.

He served as assistant general manager and general manager before becoming vice president in 1947.

Davison Chemical: Realignment of duties and titles is the order of the day for Davison. Marshall C. Roop, former secretary and treasurer was elected to the newly-created post of vice president of finance.

J. Early Hardesty, former assistant secretary and assistant treasurer was elected treasurer by the Board but will continue his duties as assistant secretary. J. Sinclair Marks will be the new assistant treasurer.

In other promotions, R. D. Goodall, former general sales manager of the industrial division was appointed assistant to the vice president, marketing. He will be succeeded by Norman E. Hathaway, who had been a member of the Davison sales staff.

Chas. S. Sanborn was made manager, market research department, for Michigan Alkali Division of Wyandotte. He replaces Paul Weller who was named district manager of the Cincinnati office.

Landon K. Thorne, Jr. has been elected president of the Vorac Company. Thorne had been vice president. In other new appointments at Vorac, Trumbull Richard was named vice president and treasurer and David E. Hartman secretary.

Elmer A. Lord, of Cowles Chemical Company in Cleveland has been promoted to position of sales promotion manager.

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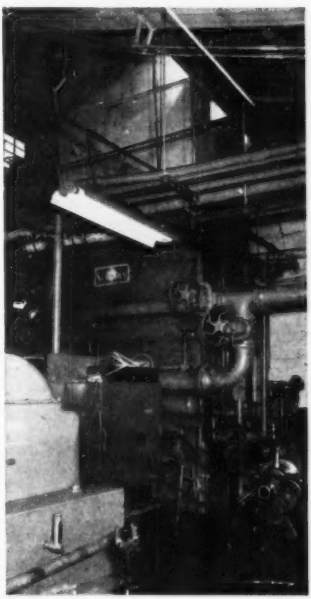

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BOOKS

Modern Chemical Processes, by the editors of Industrial and Engineering Chemistry. Reinhold Publishing Corp., New York; v +222 pp., $4.00.

This volume is a collection of 23 articles by the editorial staff of Industrial and Engineering Chemistry in cooperation with members of contributing companies. Each article is devoted to a modern full scale chemical process giving documented detailed information on a wide variety of industrial topics. First of a series to be supplemented biennially by a comparable volume, this book should prove of great value as an up-to-date record of American technology.

Distillation Equilibrium Data by Ju Chin Chu. Reinhold Publishing Corp., New York; iv+304 pp., $6.00.

Designed to furnish vapor-liquid equilibrium data for the solution of specific problems in distillation, absorption and extraction, this volume will be of interest to chemical engineers, petroleum technologists, design and construction engineers, and research men. Giving information for use in the design, performance prediction, and operating characteristics of distillation equipment in the chemical and petroleum industries, this work is divided into three parts—binary, ternary and multi-component systems—and totals 176 systems, all in tabular form. Components of each system are referred to by their common names, but at the end of the book appears a formula index in order to facilitate location of a particular system.

Analytical Chemistry of the Manhattan Project edited by Clement J. Rodden. McGraw-Hill Book Co., New York; pp. xx+748, $6.75.

This volume is one of the National Nuclear Energy Series which has been prepared as a record of the research work done under the Manhattan Project and the Atomic Energy Commission. The Manhattan Project refers to the various scientific and engineering activities which had as their objective the utilization of atomic energy for military purposes. Much of the work done resulted in technical and scientific contributions which fall in the general interest field; all these developments are also included in the series.

This text covers the determination and analysis of important materials and also describes general analytical developments in method that resulted from Project reasearch. The first 22 of the 29 chapters deal with specific elements or groups of elements, with the first two chapters devoted to uranium and thorium, respectively. The last seven chapters of the book discuss the development of certain precision analytical methods such as photometric, electrometric, spectrochemical, low-pressure, etc.

Ion Exchange Resins, by Robert Kunin and Robert Myers. John Wiley & Sons, Inc., New York 16, N. Y.; xi + 212 pp.; $4.75.

The main purpose of this book is to digest and classify the widely scattered literature on the phenomenon of ion exchange. Accordingly, it becomes a valuable reference book, dealing as it does with all phases of ion exchange and ion-exchange resins both as to theory and practice. Furthermore, this book was written to meet the needs created by the rapid increase in the industrial and research applications of ion exchange that followed the development of high-capacity, specific and durable ion-exchange resins.

Included in the book are a historical review of the subject, the theory underlying the mechanism of ion exchange in ion-exchange resins, the operational and engineering data associated with resins, and the methods of using resins in the laboratory and in industry.

Carotenoids, by Paul Karrer and Ernst Jucker. Elsevier Publishing Co., Inc., New York, N. Y.; x + 384 pp., $8.50.

A survey of carotenoid pigments, this volume was translated and revised from the Swiss edition by E. A. Braude from the Imperial College of Science and Technology of London. The present English edition contains a certain amount of new material on important recent investigations.

This treatise reviews the work which has been done, mainly during the last twenty years, by a large number of investigators whose results were scattered through various periodicals. Since carotenoids play such a vital part in various physiological processes, as in the process of vision, and in their close relationship to vitamin A, spe-

cial attention is paid to the distribution and biological significance of these polyene pigments as well as to their chemistry. The diverse material is arranged according to a careful outline so that specific facts can be readily found by readers with different points of view. Numerous tables help to clarify the relationships between the various pigments.

Briefly Listed

MODERN REFRACTORY PRACTICE, 440-page third edition dealing with industrial refractories and their applications. Published by the Harbison-Walker Refractories Co., it is a practical handbook, technical treatise, and catalog of the firm's products.

PROLOGUE TO TOMORROW is the title of a 100 year history of The Pennsylvania Salt Manufacturing Co. The book traces Pennsalt's development with references to people, places, and technical developments contributing to its present stature.

SALES AND BUSINESS FORECASTING IN CHEMICAL PROCESS INDUSTRIES, 132-page book telling what forecasting is, methods, advantages, and specific applications in chemical process industries. Available from Chemonomics, Inc., 400 Madison Ave., New York 17, N. Y., for $5.

A. S. T. M. STANDARD ON GLASS AND GLASS PRODUCTS, second edition presents in convenient form, 18 A.S.T.M. standard and tentative methods and specifications pertaining to this field. Obtainable from the American Society for Testing Materials, 1916 Race St., Phila. 3, Penn. at a cost of $1.50.

THE ECONOMICS OF THE PRINTING INK INDUSTRY, 108-page report dealing with firms, raw materials, processes, products, effect on related industries, outlook, etc. Chemonomics, Inc., 400 Madison Ave., New York 17, N. Y. $5.

MECHANISM AND EVALUATION OF ANTISEPTICS, practical monograph published by the New York Academy of Sciences concerned with the workings and comparative efficacy of the different antiseptics. Illustrated 240-page volume available from the New York Academy of Sciences for $3.

DEVELOPMENT OF THE NATIONAL BUREAU OF STANDARD CASTING RESIN, circular #493 available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. for 10 cents a copy, this publication describes methods used in determining the necessary properties of this casting material in addition to formulae and preparation techniques.

A. S. T. M. REPORT ON STANDARD SAMPLES FOR SPECTROCHEMICAL ANALYSIS, 36-page report compiling types and sources of available standard samples for the information of analysts. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Cost, $1.25.

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Plastic Paints

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Plasticizers

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Laminated Plastics

6-p. illustrated technical folder containing detailed information on design and machining techniques for users of laminated plastics. Synthane Corp.

Plastics

4-p. bulletin describing company's line of laminated and molded plastics. The Richardson Co.

Equipment

Ram

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Welding

43-p. detailed manual of welding engineering and design. Eutectic Welding Alloys Corp.

Electronic Instruments

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Hoists

Bulletin featuring new link chain model Pul-lift and its operational uses as a portable device for hoisting and pulling. The Yale & Towne Manufacturing Co.

Kjeldahl Equipment

16-p. bulletin giving complete description of the entire line of newly-standardized Kjeldahl equipment, ranging from two to twenty-four unit digestion and distillation plus micro digestion units. Precision Scientific Co.

Dipping Baskets

Bulletin containing tables as a guide to proper selection of materials for dipping baskets according to their various applications. Hanson-VanWinkle-Munning Co.

Moisture Meter

4-p. bulletin on the dielectric moisture meter, giving specifications, method of operation and typical applications of product. Tagliabue Instruments Div., Weston Electrical Instrument Corp.

Relays

4-p. catalog illustrating and listing the firm's line of heavy-duty mercury plunger relays and sensitive rays. Ebert Electronics Corp.

Water Heater

4-p. bulletin dealing with steam-mixer water heaters which mix steam directly with water to provide instantaneous hot water at controlled temperatures. O'Brien Steam Specialty Co., Inc.

Moisture Tester

Bulletin describing and illustrating advantages, structural details and applications of portable universal moisture tester. Sheldrick Manufacturing Co.

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24-p. illustrated bulletin describing Class O-CE horizontal duplex motor-driven compressors emphasizing new design feature of anti-friction bearings throughout. Chicago Pneumatic Tool Co.

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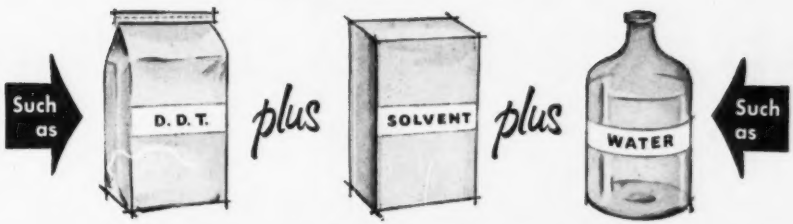

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